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Table of Contents

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ORIGINAL ARTICLES—

- Listerian Oration—"Gynaecological Problems Considered in the Light of Listerism", by F. A. MAGUIRE, C.M.G., D.S.O., V.D., M.D., Ch.M., F.R.C.S., F.R.A.C.S., F.C.O.G. 61
"Outline History of the Education of the Blind", by SIR JAMES BARRETT 69
"The Quantitative Effect of X Rays on Mitosis in the Mouse Carcinoma (M.63)", by W.M. H. LOVE, B.Sc., Ph.D. 70

REVIEWS—

- Dermatology 70
Notes on Growth 71
Sex 71

NOTES ON BOOKS, CURRENT JOURNALS AND NEW APPLIANCES—

- Progress in Medicine 72
Books on Sex and Marriage 72
The Medico-Legal and Criminological Review 72

LEADING ARTICLES—

- The Fourth Australian Cancer Conference 73

CURRENT COMMENT—

- Asthma 74
A New Biological Test of Pregnancy 75
The Hobart Congress 75

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

- Physiology 76
Biological Chemistry 76

BRITISH MEDICAL ASSOCIATION NEWS—

- Nominations and Elections 78

PUBLIC HEALTH—

- Canberra Cancer Conference 78

OBITUARY—

- Robert Humphrey Marten 92
Septimus George Strahan 95

POST-GRADUATE WORK—

- Post-Graduate Course in Brisbane 95

UNIVERSITY INTELLIGENCE—

- The University of Sydney 95

CORRESPONDENCE—

- The Royal Australasian College of Surgeons 95
The Problem of Gastric Carcinoma 95
The Tonsil Problem 95

PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—

- Victoria 95

BOOKS RECEIVED

DIARY FOR THE MONTH

MEDICAL APPOINTMENTS

MEDICAL APPOINTMENTS VACANT, ETC.

MEDICAL APPOINTMENTS: IMPORTANT NOTICE

EDITORIAL NOTICES

Listerian Oration.¹

GYNÄCOLOGICAL PROBLEMS CONSIDERED IN THE LIGHT OF LISTERISM.

By F. A. MAGUIRE, C.M.G., D.S.O., V.D., M.D., Ch.M. (Sydney), F.R.C.S. (England), F.R.A.C.S., F.C.O.G., Honorary Gynaecologist, Saint Vincent's Hospital; Honorary Assistant Gynaecologist, Royal Prince Alfred Hospital, Sydney.

LET me acknowledge the great honour that you have conferred in inviting me to deliver to your Association this Listerian Oration. It is one that I appreciate deeply and value highly. The high standard that has been set by previous orators, together with the occasion itself, makes one realize what should be expected when we meet to do honour to the memory of a great man. It shall be

my aim to endeavour to place before you a review of the history of gynaecology and the problems that face those who devote themselves to this specialty, and to consider these subjects in the light of Listerism.

The world owes a deep debt of gratitude to Joseph Lister. He takes his place worthily amongst those great few whose vision and moral courage have raised them far above their fellows and have placed them on a pedestal before which not only their peers in their own profession, but every layman may pay homage. His life history bears upon it the imprint of constant steady endeavour and high ideals which every young student and graduate in medicine may well take as a model.

Joseph Lister was born at Upton, in Essex, one hundred and six years ago, on April 5, 1827. His father, Joseph Jackson Lister, was a London wine merchant. The latter must have been imbued with a scientific spirit, for in his spare time he undertook

¹ Delivered at a meeting of the South Australian Branch of the British Medical Association on May 25, 1933.

the study of optics. Nor was this an idle pastime, for in 1830 he brought out an improved achromatic lens for the microscope. This would seem almost to be prophetic, for it was through the microscope and the discoveries of the decade in which this work was done that modern medical science was placed on a firm foundation. It was in 1837 that Schleiden and Schwann published their revolutionary doctrines on the constitution of the cell. On this work is based the cell theory, which is the foundation of the teachings of modern medicine and surgery and, indeed, of the whole field of biology. One cannot help thinking that a father who was so interested in microscope work must have taken an interest also in the scientific work that was being produced in his own time; and one cannot help feeling that the boy, Joseph Lister, growing up in such a household, must have had his mind directed along scientific lines even during his early boyhood, or that at least he must have had his interest aroused in these things from a very early age.

We do not know what influences caused his mind to turn to the medical profession as a means of livelihood. But we know that he graduated in the University of London in 1852. While he was at the University he wrote several papers on the histology of muscle, which were beautifully illustrated. His microscopic training must therefore have been sound from the beginning. Two of his teachers, William Sharpey and Thomas Graham, both Scotchmen, advised him to study under Syme in Edinburgh. Syme at that time was the doyen of surgeons in the British Isles. How fortunate was young Joseph Lister to fall, at an age when his mind was still plastic and pliable, and when it had already been modelled along scientific lines by his early study, under the influence of a man who was so great in surgery and who held such an eminent position! He became house surgeon to Syme in 1854. Out of his association with Syme's household there came Lister's marriage with Syme's daughter, forging still further the link of common interest between these two men.

In 1860 Lister became Professor of Surgery in the University of Glasgow, where he had every opportunity to carry out investigations and research. From the period 1859 to 1863 he undertook a special investigation of the problem of coagulation of the blood, during which time he exploded the theory that this was due to liberation of ammonia, as was previously taught. He showed by experiment that in the blood vessels coagulation of the blood depended on injury. In the light of our present knowledge we can see what an important step this was in surgery. He spent all his leisure hours in study and investigation. In 1865 he published his classical paper on excision of the wrist for caries. Surgery at that period laboured under great disadvantages. Sepsis was rife and anaesthesia was only in its infancy. Lister found, from 1864 to 1866, that 45% of his amputation cases were fatal. This was due to sepsis, gangrene and septicæmia. A few years earlier Semmelweis

had driven himself crazy worrying over the problem of sepsis in obstetrics, but he had almost landed upon the great truth that was to solve this problem. About this time Pasteur was working on the problem of putrefaction and the part that was played by microorganisms in the causation of the decay of animal tissues. Lister turned the full force of his great mind on the problem of the prevention of sepsis. Linking it up with Pasteur's work, he tried the effect of various chemical antiseptics, using particularly chloride of zinc and sulphites. These were unsatisfactory. He found that carbolic acid was being used for the purification of sewage at Carlisle. It was being used empirically, but the result seemed to be very good. Lister therefore decided to try carbolic acid. On August 12, 1865, only sixty-eight years ago, and within the life time of many medical men practising today, he employed it for the first time in the treatment of a compound fracture with complete success. The story is well known to you all. In 1867 he published two papers, the second of which was: "On the Antiseptic Principle in the Practice of Surgery." This was the foundation of modern surgery. But he did not establish his principles without the bitterest opposition from the conservative members of the profession. However, he went on from success to success.

In 1869 Lister succeeded Syme as Professor of Surgery in Edinburgh. In 1877 he was invited to occupy the chair of King's College Hospital, London. This brought him back amongst his colleagues where he had graduated. The story of the opposition that he met and of the violent criticisms that were aimed at him is only another evidence of that spirit of intolerance with which the world very frequently receives new ideas. One cannot uproot old established customs or refute ideas that have been practised for hundreds of years without finding that the human mind in the mass is very resistant to change. But Lister was made of stern stuff, and never at any time did he let go the principles which drove him to his conclusions. From 1895 to 1900 he was the President of the Royal Society. While in this position of eminence he had the satisfaction of seeing the world adopting everywhere the teachings to which he had devoted his life. His country recognized his work and therein he was fortunate, for it is not given to every man to receive recognition at the hands of his fellows during his lifetime. In 1883 Her Majesty the Queen made him a baronet. In 1897 he was raised to the peerage as Lord Lister. He had the honour of becoming the first medical peer with a seat in the House of Lords. In 1912 he died.

Twenty-one years ago Joseph Lister passed away, two years before the Great War. It has been said that he saved more lives than wars have destroyed. His influence on surgery has been most profound, in that he established the principles of antiseptic surgery which have in the years following been replaced by aseptic surgery. The work of Lister has saved innumerable lives and has extended the

scope of surgery into every region of the body. It has enabled us to open every cavity to the exploring eye and finger, and has exposed every tissue to the fullest investigation. Seventy years ago the practice of surgery was confined to the limbs and to a few internal operations. The head, the chest, the abdomen, the joints were refuges in which germs could flourish and destroy with impunity. Since Lister's time the surgeon has been enabled to open all these cavities and to deal with whatever of new and unsuspected menace he might find lurking there. But perhaps one of the greatest fields in which Listerism has conferred a benefit upon the human race is in child-bed. Through the influence that it has had on obstetrics and gynaecology, Listerism, or the practice of antisepsis and asepsis, has been one of the greatest boons ever conferred on the women of the world. Pasteur it was who unmasked the work and damage done by micro-organisms, but it was Lister who, with cool courage and indomitable determination, applied these teachings to the fields of surgery.

There was, however, another great discovery made during Lister's early years, which, taken hand in hand with Listerism, has enabled surgery to advance beyond the wildest dreams of our forefathers. When Lister was nineteen years of age (1846) he was present as a student at University College Hospital during the first great European trial of anaesthesia. Liston operated that day on Frederick Churchill. He did an amputation of the thigh, and William Squire gave ether. Liston, who was perhaps one of the most brilliant operators of the day, was confounded by the possibilities of this new discovery. Instead of an amputation being done at lightning speed, it could be done as a deliberate anatomical dissection. The possibilities opened up by the slowing down of operating and the added time that could be given to deliberate and skilled dissection altered completely the outlook of surgery. Up to that time the surgeon was a man of iron nerve and extraordinary dexterity. He operated on patients strapped to the table or stupefied with some narcotic, but he operated always against time and in the simplest and quickest possible way. There could be very little refinement of technique or of procedure. Speed was essential. Shock and sepsis took their dreadful toll in the majority of operations. An operation was in many cases a death sentence to the patient. The combination of anaesthesia, which gave the surgeon time to do the operation in comfort and with accuracy, and the use of antisepsics, which enabled him to safeguard his patients from the assaults of microorganisms, together form two of the chief blessings of modern surgery. We may say without any hesitation that the foundation of modern surgery rests upon the relief of pain and the mastery of sepsis. But let us remember that it is not given to every reformer to be listened to by his own generation, for in 1847 Semmelweis had propounded the theory that puerperal sepsis was in reality a pyæmia. He showed that it was conveyed by septic

hands from the dissecting room and the *post mortem* room to the lying-in chamber, but he was not listened to. He did not understand the nature of the infection, but by reasoning and observation he realized how it was conveyed. He died finally in an insane asylum as a result of the bitter criticism and mockery which were directed at him. Lister was much more fortunate in that his discoveries were based on the investigations of Pasteur, and that the discovery of anaesthesia gave the surgeon a real opportunity to put these principles into practice. Lister was the first to acknowledge the debt that he owed to Pasteur. As one writer has said:

The first direct descendant of Pasteur's germ theory of putrefaction was Lister's antiseptic method in surgery. Before the advent of Listerism a hospital was the morgue's anteroom, where even trifling operations, no matter how skilfully performed, frequently terminated in frightful suppuration, sepsis and death. The operating table was as dangerous as the battlefield, and the rivers of pus that flowed through the wards were more terrifying than the blood spilled in carnage. As an enemy the streptococcus was as fully redoubtable as any cannon ball.

Lister's discoveries and the operating methods which he adopted as a result of them, altered this and brought about the greatest and kindest change that has ever taken place in the history of surgery. Lord Lister himself never forgot that he owed his successes to Pasteur's discoveries, which he had taken and applied to surgery. In Lister's original communication, which was published in 1867, he referred to Pasteur's work. In 1874 he sent Pasteur a letter giving him complete acknowledgement of the debt that he owed him. He wrote:

My Dear Sir,

Allow me to beg your acceptance of a pamphlet, which I send by the same post, containing an account of some investigations into the subject which you have done so much to elucidate, the germ theory of fermentative changes. I flatter myself that you may read with some interest what I have written on the organism which you were the first to describe in your "Memoire sur la Fermentation Appelée Lactique".

I do not know whether the records of British surgery ever meet your eye. If so, you will have seen from time to time notices of the antiseptic system which I have been labouring for the last nine years to bring to perfection.

Allow me to take this opportunity to tender you my most cordial thanks for having, by your brilliant researches, demonstrated to me the truth of the germ theory of putrefaction and thus furnished me with the principle on which alone the antiseptic system can be carried out.

Should you at any time visit Edinburgh, it would, I believe, give you sincere gratification to see at our hospital how largely mankind is being benefited by your labour.

The generosity and international outlook of the true scientific mind shines out of this letter as a lesson for us all.

Of Lister the man much has been written. Garrison, in his "History of Medicine", tells us something of his surgical style:

As an operator, Lister was not brilliant, but deliberate and careful, aiming to make the recovery of his patient a mathematical certainty. His Quaker sobriety, his severe and austere ideals were not the traits that make for rapid and showy success. His progress was slow; he left no school, but before he died the entire guild of surgeons "lived in his mild and magnificent eye". When his body was laid to rest at Westminster, England had buried her greatest surgeon.

In the Memorial Discourse at Edinburgh in 1912 the Reverend Wallace Williamson said:

Of Joseph Lister's winsome personality, those speak most warmly who knew him best. It was his gentleness above all that made him greater. His very presence was a spiritual force. Clear eyed and pure of soul, he cherished from earliest days that love of truth which guided him to the end. His noble passion for humanity extinguished all thoughts of self and personal fame, impelling him along that path which he steadfastly pursued till he found the secret of his search and bestowed on the world probably the greatest boon which science has been able to win for the physical life of mankind. Yet greater than his greatest achievement was the man himself, and the final secret of his greatness was that serene simplicity which was his most distinguished characteristic . . . His was the grave and thoughtful courtesy which bespoke the Christian gentleman and the earnest lover of his kind. Hence we are not surprised to learn how he stirred enthusiasm and moved men to reverence, how he gained such love and affection as rarely fall to a scientific teacher. Behind his acknowledged mastery of his science, his grave and noble face, marked by soft lines of tranquil thought, revealed a soul of singular beauty and sweetness, of high integrity and stainless honour. That such a man, dowered with God's gift of genius, should rise to lofty heights and achieve great things was inevitable.

Tonight, however, I wish to direct your attention to the special field of gynaecology and to consider the influence that Lister's work has had upon this specialty. As long ago as 1896, writing in Allbutt and Playfair's "System of Gynaecology" on the subject of "The Development of Modern Gynaecology", M. Handfield Jones wrote:

It will always be a pleasant task to acknowledge the deep debt of gratitude which gynaecology owes to Sir Joseph Lister; for without his scientific discovery and brilliant teaching, the successes of modern pelvic and abdominal surgery could never have been won.

Here, in a nutshell, we have the full acknowledgement of the debt that gynaecology and abdominal surgery owe to Joseph Lister. Let us now turn aside and see what had been done in gynaecology before the epoch-making days of the nineteenth century.

Gynaecology is perhaps in its broadest sense as a study of the diseases of women, the oldest of all medical and surgical specialties. As long as women have borne children they have paid in some way or another some physical penalty for their labours. The stress and strain of child-bearing has left its mark on womankind from the beginning of time. It has been the function of the obstetrician and the gynaecologist to endeavour to diminish this damage, or, after it has been done, to put it right as far as possible. Apart also from all the problems concerned with pregnancy, the special organs of women have been subject to their own particular diseases and have, of course, been affected by diseases of other parts of the body. Throughout the centuries medical men have devoted particular attention to these problems. If we take a broad general classification of disturbance of function and disturbance of structure, we find that gynaecological conditions are concerned with the functions of the ovaries, tubes and uterus, or alteration in their structure, position, size and shape. In no part of the body is there more necessity for an intelligent cooperation between the sciences of physiology and anatomy. Function and structure are intimately related here

as elsewhere. One who would devote his attention to the study of diseases of women must lay a sure and certain foundation in the study of the anatomy and the physiology of the female reproductive organs.

Further, medical literature shows us that from the earliest times on record our forefathers were interested in the study of the diseases of women. References to womb troubles and menstrual disturbances occur over and over again, but their knowledge was, of course, rudimentary, and the treatment was almost entirely empirical. In the Ebers papyrus, which dates back to 1550 B.C., there are many references to gynaecology. Prolapse of the womb is specially mentioned, while pain in the vulva and vagina and disturbances of menstruation are prescribed for. There are many references to be found also in the Sacred Vedas of the Hindus, which date from 800 to 600 B.C. Egyptian and Greek writings both contain many gynaecological references. Hippocrates (460 B.C.) referred to disturbances of the menses and the use of pessaries and suppositories. Complete prolapse of the uterus was a condition well recognized in those times. The Roman medical writers also included many gynaecological references. Celsus, who lived from 53 B.C. to A.D. 7, described the uterus and the vagina, the use of pessaries, catheters, massage for the treatment of gynaecological conditions, prolapse of the uterus, stones in the bladder, swelling and ulceration of the vulva, and referred to the operation of paracentesis, or tapping the abdomen for dropsy. But all the treatment adopted was palliative and symptomatic. All surgery was more or less rudimentary. The majority of women must have been unrelieved of any condition which required any extensive operative interference. Chronic invalidism and disablement must have been far more common amongst women, particularly as age advanced or as families increased.

Soranus of Ephesus, in the second century A.D., was a leading authority on gynaecology and obstetrics. He wrote and published a treatise on midwifery and diseases of women.

Medicine and surgery, in common with the various other branches of science, underwent a period of stagnation during the dark ages. Very little advance was made until the fifteenth century. The commencement of operative gynaecology is attributed to Jacob Nufer, who was a sow gelder. He is said to have performed a successful Caesarean section on his own wife in the year 1500, and it is reported she lived to be seventy-seven and bore other children. In 1580 Rousset enumerated fifteen Caesarean sections which had been performed up to that time. During the sixteenth century a large "Encyclopaedia of Gynaecology" was published by Caspar Wolf, of Zurich, in 1566. This was enlarged by Caspar Bauhin, of Basel, in 1586, and was republished by Israel Spach, of Strassburg, in 1597. The first work on operative gynaecology in the modern sense was published by Hendrick Van Roonhuyze in 1663. It was illustrated with unique copper

plates and showed his mode of incision in Cæsarean section. It contained in addition case reports of extrauterine pregnancy and rupture of the uterus. Dr. Howard Kelly has pointed out that he (Van Roonhuyze) first proposed a scientific operation for vesico-vaginal fistula, the features of which were exposure of the fistula by a retracting speculum with the patient in the lithotomy position, marginal denudation, exclusion of the bladder wall and approximation of the denuded edges of the fistula by means of quills fastened by silk threads.

During the eighteenth century there were isolated contributions to the literature on the subject. Garrison has drawn attention to: Robert Houston's treatment of an ovarian dropsey (1701) by tapping the cyst; William Hunter's proposal for excision of ovarian cyst in 1757, and his description of retroversion of the uterus (1770); Sigault's symphysiotomy (1777); Matthew Baillie's description of dermoid cysts of the ovary (1789) and Soemmerring's essay on the injurious effects of corsets (1793). George Ernest Stahl (1660-1734) wrote a lengthy monograph on the diseases of spinsters in the year 1724, and Jean Astruc wrote a six volume treatise on diseases of women in 1765.

But it was not until the nineteenth century that surgical gynaecology was established on a sound foundation. In 1809 Ephraim McDowell, of Virginia, performed ovariotomy on Mrs. Crawford, who was aged forty-seven. She lived afterwards to the age of seventy-eight. He performed the operation thirteen times, with eight recoveries. In those days ovarian cysts were allowed to grow to an enormous size, and at times the tumour was as large or larger than the patient.

When Joseph Lister was a boy (about the year 1840), J. Y. Simpson in England and Huguier in France stimulated widespread interest in uterine pathology. Simpson wrote on pelvic cellulitis, haematocele, and uterine cancer; on hermaphroditism; on uterine displacement; the uterine sound; on non-puerperal diseases of the uterus; on coecygodynia; on surgical fever and on ovarian dropsey. In 1845 Dr. H. J. Bennett published his work on inflammation of the uterus. When we remember that at this time bacteriology and pathology were only in their infancy, we can acknowledge that the chief points made by Dr. Bennett at this time were important advances and opened up new fields of thought. His chief points were:

1. That inflammation is the chief factor in uterine infection, and that, as a result, there follow from it displacements, ulcerations and affections of the appendages.
2. That menstrual trouble and leucorrhœa are merely symptoms of this morbid state.
3. That in the vast majority of cases inflammatory action will be found to confine itself to the cervical canal and not to affect the body of the uterus.
4. That the disease is properly attacked by strong caustics.

This work directed the attention of gynaecologists to the importance of investigation of the uterus and the great part this organ played in pelvic pathology. Attention was still further directed to

the pelvic viscera by the publication by Dr. Tilt in 1850 of his work on ovarian inflammation. His main points were:

1. That the recognized frequency of inflammatory lesions in the ovaries and in the tissues which surround them is of much greater practical importance than is generally admitted.
2. That of all inflammatory lesions of the ovary, those involving destruction of the whole ovary are rare, while the most numerous, and therefore the most important, may be ascribed to a disease that may be called either chronic or subacute ovaritis.
3. That, as a rule, pelvic diseases of women arise from morbid ovulation.
4. That morbid ovulation is a most frequent cause of ovaritis.
5. That ovaritis frequently causes pelvis peritonitis.
6. That blood is frequently poured out from the ovary and the oviducts into the peritoneum.
7. That subacute ovaritis frequently initiates and prolongs metritis.
8. That ovaritis generally leads to considerable and varied disturbance of menstruation.
9. That some chronic ovarian tumours may be considered as aberrations from the normal structure of the Graafian cells.

These observations represent a great advance in pelvic pathology. Looking at it all from the light of our present knowledge, we can see the link was missing. Inflammation of the uterus and inflammation of the ovary are linked up either by direct spread through the uterine tubes or through the lymphatics; but we must remember that the processes of inflammation themselves were not understood, nor were the underlying causes appreciated by the writers of the time. Their observations were purely clinical and *post mortem* observations. They were still seeking for the underlying causes. We owe a great deal to the acute observation and the close attention that our predecessors paid to clinical signs and symptoms. They were clinical observers in the true sense of the word.

In 1854 a new factor was introduced in gynaecology. The battle of uterine displacements and the cult of the pessary were initiated then. Hodge in America, Velpau in France, and Grailly Hewitt in England stood out as champions of the immense importance of malposition of the uterus in the causation of pelvic disease. An endeavour was made to place the responsibility for all pelvic pathology directly or indirectly on displacements of the uterus. Velpau said:

I declare, nevertheless, that the majority of the women treated for other affections of the uterus have only displacements, and I affirm, 18 times out of 20, patients suffering from disease of the womb, or of some other part of this region—those, for instance, in whom they diagnose engorgements—are affected by displacements.

Grailly Hewitt, in his "Diseases of Women", writes:

1. That patients suffering from symptoms of uterine inflammation are almost universally proved to be affected with flexion or alteration in the size of the uterus; an alteration of easily recognized character, though varying in degree.
2. That the change in the form and shape of the uterus is frequently brought about in consequence of the uterus being previously in a state of unusual softness, or what may be often correctly designated as chronic inflammation.

3. That the flexion, once produced, is not only liable to perpetuate itself, so to speak, but continues to act incessantly as the cause of the chronic inflammation present.

Every gynaecologist invented a pessary. The shapes that were evolved were in many cases fearful and wonderful. Clifford Allbutt wrote:

The uterus could justly complain that it was always being impaled on a stem or perched on a twig. It certainly could not complain that there was want of variety in the stem or monotony in the contour of the twig.

Thus we see the blame for uterine inflammation was placed on displacements. Can we wonder that there was great confusion in the minds of gynaecologists even eighty years ago as to the underlying cause of pelvic pathological conditions. The pelvis was rarely, if ever, opened during life. The "pathology of the living", as preached by Lord Moynihan, was unknown at that time.

Between 1850 and 1865 there are several names which stood for progress in gynaecology. Spencer Wells, whose name is kept alive today by the artery forceps to which his name is attached, did his first successful ovariotomy in 1858. His work was very sound and he became widely known as a safe operator in ovarian conditions. He published his work on "Diseases of the Ovary" in 1865. Lawson Tait settled in Birmingham in 1871. He was a great opponent of Lister, but at the same time he used boiled or warm water to wash out the abdomen, and used simple cleanliness in all his work. In 1862 Bernutz and Gaupal published their work on pelvic cellulitis, but Gaillard Thomas in 1880 showed that much of the inflammation about which the previous authors wrote was really pelvic peritonitis. But we cannot wonder that at that stage of pathological knowledge it was difficult to draw a distinction between the two.

From the seventies of last century gynaecology began to expand with tremendous rapidity. The boldness and safety with which the abdomen could be opened by the combination of anaesthesia and antiseptics gave heart and courage to operators in every part of the world. The surgeons who did gynaecology showed the way into the abdominal cavity, but this field soon became the happy hunting ground of all surgeons. Bland Sutton in England and Howard Kelly in America led the way in expanding the specialty of gynaecology. Inflammation, displacements and new growths were attacked from above and from below by methods almost too numerous to mention. At the present time there is not one anatomical structure in the female pelvis which is not considered fair game for the surgeon's knife. All this has been made possible by the revolutionary discoveries of Joseph Lister and his followers. No longer do we see the huge ovarian cysts and the enormous fibroids described by surgeons of fifty years ago. Women are not condemned to go throughout life with a displacement or a prolapse to which no relief can be given. Inflamed tubes and ruptured ectopic gestations are dealt with either in the early or the late stage with success and with an extremely low rate of post-operative mortality. This must mean that there are

thousands of women alive and well today who would otherwise be dead or chronic and permanent invalids. It is almost impossible to estimate the difference that all these advances in surgical knowledge and skill must mean to the comfort and well-being of our people. Healthy mothers and healthy wives are a necessary foundation on which to build a healthy nation, and the home life of our people depends on the good health of the women of the families.

But hand in hand with all this development of surgical technique and pathological knowledge there has gone a tremendous advance in our knowledge of the physiology of the female pelvic organs. Indirectly this is largely the outcome of Listerism too, for many delicate experiments have been performed on animals, and a very great deal of surgical work and scientific research have been carried out by this method. Our knowledge of the internal secretions and the functions of the uterus, tubes and ovaries has advanced in every direction. The mysteries of menstruation and ovulation are gradually being unfolded before our eyes. The influence of the glands of internal secretions, not only in the pelvis, but in every part of the body; the intimate actions and reactions that take place between the pituitary gland, the thyroid gland, the suprarenal gland, the mammae and the ovaries, are being solved for us in the laboratories of the physiologists and the experimental surgeons. Biological chemistry has come to our aid in explaining many things that were completely hidden from the generation that was before us, and the purely physical aids of X rays, radium and diathermy, and the various uses to which the electrical current can be put in diagnosis and in treatment have widened the field of therapeutics and have strengthened our hands in our attack upon disease.

But out of all this progress there has arisen, particularly amongst the younger generation of medical practitioners, an idea that gynaecology is essentially a surgical subject. This is an idea which I wish most strenuously to combat. When one sees in all our large general hospitals that the gynaecological patients are concentrated in wards which are 95% surgical, and when one sees in the operating theatre the treatment of gynaecological conditions by operation day in and day out, one can easily realize how the young student and the young medical practitioner may be carried away with the idea that the treatment of all gynaecological conditions and the correct method of dealing with all diseases of women is by means of surgery in one form or another. Undoubtedly there are many conditions for which surgery is the only possible and rational treatment. The removal of tumours, the correction of gross displacements, the repair of lacerated, torn and damaged tissues, the repair of prolapses and the removal of grossly pathological organs are fair and proper fields for the practice of surgery. But there are many conditions from which women suffer that are really non-surgical in their origin and which should be treated by medical or

non-operative means. I would have the gynaecologist as much a physician as a surgeon. Indeed the gynaecologist should approach all his cases with a medical outlook rather than a surgical one. I would plead for the broad and general view that the patient is an individual suffering from a condition which is probably affecting her whole health, and it is our duty to determine how far the condition from which she is suffering is general in its origin and effect and how far it is local. Not every displacement requires surgical interference as soon as it is diagnosed. Nor does every inflammatory condition in the pelvis call urgently for immediate removal by the surgeon's knife. The tired and overworked mother and housewife who has perhaps borne children in quick succession, can very often be restored to a condition of almost complete health by rest and change and by tonic treatment. To operate on such women for a minor displacement or for a low grade infection is to add further burdens to an already overtired nervous system.

The teachings of Lister have made it a safe and simple matter to open the abdomen, but it is wrong to take advantage of this ease and simplicity and to develop a lazy and unscientific frame of mind which simply dictates a policy of "open and look". Our forefathers developed a high sense of clinical acumen and diagnostic skill which we today, with the facilities at our disposal for X ray and pathological examination and the ease and safety with which explorations can be carried out, are in danger of neglecting. I would urge on our surgical teachers and our gynaecological instructors how important it is to instruct their students in arriving at a diagnosis with their eyes, their fingers, their stethoscope and their thermometer, and to cultivate their clinical investigations and observation to the highest pitch of efficiency. Let us use our diagnostic aids by all means, but let them be aids in diagnosis rather than primary lines of attack. With all the knowledge that is available to us today it should be possible in the vast majority of our cases to come to a reasonably accurate diagnosis and to direct our treatment along sound scientific lines, so that surgery is our handmaid and not our mistress. A patient and careful investigation of the history, a properly planned and thoroughly executed physical examination, reinforced by the resources of the laboratories and the X ray room, should enable us to determine whether our patient requires operation or whether she can be restored to health by non-operative means. Except in those groups of cases to which I have already referred, it requires a higher order of skill and is a greater triumph for the medical practitioner to restore his patient to health without having to resort to purely surgical procedures. *Primum non nocere* ("Take care that in the first place you do no harm") might well be a motto for us all to bear in mind in approaching our patients.

The future of gynaecology lies before us. In the words of Havelock Ellis:

The present is in every age merely the point where past and future meet . . . There is never a moment when the new dawn is not somewhere breaking over the earth, and never a moment when the sunset ceases to die: we should greet the new dawn serenely, not hastening towards it with undue speed nor yet leaving without regret the dying light that was once dawn.

Here is the key to our mental attitude to the future. We remember with gratitude and we use with pride the lessons of the past. We strive today to give the best that is in us; and all the knowledge we have gained from our forefathers we place at the disposal of our patients. But what are we doing towards the future development of gynaecology and surgery? Is every case we see a stimulus to us to look further into the condition which confronts us and to attempt to solve the many problems which baffle us?

Let us now examine the present position of gynaecology and speculate on the future developments in its several departments.

The treatment of displacements has been put on a very sound basis by the application of the principles of anatomy. As we have seen, they were for a time regarded as the cause of all pelvic pathological conditions, and were treated by mechanical supports. With the advent of abdominal surgery there have been dozens of operations of different types evolved, and their name is legion. The round ligaments have been the sheet anchor—or should I say bowline—by which most uteri have been restored to their normal position, although many forms of direct fixation or suspension of the uterus have been practised. But not every displacement calls for surgical repair. The gynaecologist of the future will discriminate carefully in distinguishing between the patient who may be left alone and the one who needs operation. I feel that when he does decide to operate, he will select an internal shortening of the round ligaments in women who can bear children, and a ventrofixation for those who will bear no more family. But in prolapse there is little doubt but that the abdomen will be opened with less and less frequency, and that a thorough repair of the structures of the pelvic floor and the pelvic connective tissue, designed and carried out on strict anatomical lines, will be the operation of the future. But it will be recognized that many women can be made perfectly comfortable with a suitable, well-fitting pessary. For there are many of the menopausal age, and others too, who are most unwilling to undergo the mental trauma of operation and are content with palliative measures. Provided no undue risks are taken, they should be given relief by non-operative measures.

Infections of the genital tract should become less frequent as time goes on. Venereal infection should diminish with wider sex education and proper prophylaxis. Gonorrhœa is a preventible disease, and as the late King Edward said: "If preventible, why not prevented." Frankness and proper education will in time eliminate it from our social system. At present it causes far too much waste,

pain and sterility. In the meantime acute attacks should be dealt with by conservative means, but chronic or repeated attacks of salpingitis will need salpingectomy, or if the uterus is chronically infected, hysterectomy also.

Puerperal infections should diminish with added care and a wider appreciation of the application of Listerism to all disturbances of gestation, early or late. Here, too, conservatism is required. I feel strongly that there will be less surgical interference with acute salpingitis, for the uterine tube is not, like the appendix, a vestige, but a most important physiological organ, which over and over again repays conservation by conferring the boon of motherhood on its possessor, even after it has passed successfully through the throes of an acute salpingitis.

When the infections have spread to the pelvic connective tissues or the peritoneum, producing those serious complications, pelvic cellulitis and pelvic peritonitis, surgical treatment is called for only to evacuate collections of pus. Rest, heat, and measures directed to the improvement of the general health will be the trusty aids of the gynaecologist of the future. Hilton's "Rest and Pain" is a reliable guide to the treatment of these chronic inflammatory lesions. I have in an excess of surgical zeal opened abdomens so full of inflammation and so angry to look at that I have closed them in despair without doing anything further, and have been amazed in twelve months' time to find the patient not only perfectly well, but pregnant into the bargain. But these are cases which call for a high degree of medical and surgical judgement. If in doubt, give Mother Nature a chance; she is a wonderful physician. The hot water bottle is softer, safer, and more soothing than the scalpel in many an inflammatory pelvis, and the long hot douche has caused many a phlegmonous pelvis to resolve if repeated with sufficient frequency.

What will the future have to say in regard to tumours? Innocent new growths of the uterus and ovaries will be removed with conservation of the organ itself whenever possible. Myomectomy will be practised more widely in the child-bearing period. Much has been written in the last ten years in regard to the conservation of ovaries. Fothergill, Polak, Novak, and other eminent gynaecologists have analysed many operative results, and point out that an ovary conserved after hysterectomy has only a short life—two to three years—and is likely to become painful and to degenerate. But I feel that in the future still greater efforts will be made to retain to the patients a portion at least of this unique tissue, and that the conservative surgery of the ovary will be practised still more in the days to come.

In the field of malignant tumours surgery has done great service. The future is hopeful here, for our new therapeutic aids, radium and deep X ray therapy, are of great value and promise still greater things. At present I urge my colleagues to

strike a proper balance between surgical treatment and these newer allies. I believe that the best results are and will be obtained in cancer of the cervix, first by early diagnosis, then by thorough treatment with radium by an approved technique, followed by a thoroughly well done anatomical removal of the uterus and appendages, with complete ablation of the gland-bearing areas. The deep X rays should then be applied by a skilled therapist over the whole pelvic area for a full course of treatment. Anything short of this complete and systematic treatment exposes the patient to a greater risk of recurrence than she should have.

All ovarian cysts should be removed when diagnosed. The latest figures of Wilfred Shaw show that as many as 25% of ovarian cysts become malignant. If they are removed surgically at an early stage, many lives will be saved.

It is in the field of functional disturbances that we should look for the greatest progress in the future. Amenorrhoea, menorrhagia and dysmenorrhoea, and many cases of dyspareunia and sterility are due to some disturbance of balance in the glands of internal secretions. Much very valuable work has been done in the last five years in investigating the physiology and pathology of menstruation and ovulation. The biochemist and the experimental surgeon have a fruitful field for research, together with the physiologist. He would be a bold man who would forecast future developments. But the future is full of hope. Endocrinology is advancing by leaps and bounds. Hormones, vitamins, and internal secretions are yielding their secrets, and I believe that organotherapy and chemical therapy, which are at present most uncertain in their application and results, will before long place most valuable therapeutic measures within our grasp. Many patients suffering from severe and disabling disturbances of function will receive relief by means other than surgical.

The future of gynaecology, in common with medicine and surgery, of both of which it forms part, is bright with hope. Lister has opened the door to many brilliant surgical successes. Our surgeons are achieving great things and womankind is reaping many benefits in health and safety. Let us stimulate our young men to observe, to think, and to apply the resources of science to these great problems of life and death. There are still many doors to be opened, but courage, patience and knowledge will provide the keys. Marconi once said that great scientific discoveries were like great animals hiding in caves, with their tails hanging outside. The man who had the wit to see the tail and to follow it up came on to the discovery itself. Let us all keep our eyes open and our minds alert. Let us keep abreast of the literature of our great science, and always be on the watch; and in days to come the women of the world will reap the harvest of freedom from pain and fear, of comfort and safety in the great crises of their lives; and we will banish invalidism and build a strong and healthy nation to follow after.

**OUTLINE HISTORY OF THE EDUCATION OF
THE BLIND.**

By SIR JAMES BARRETT,
Melbourne.

UNTIL the eighteenth century there were asylums for the blind, but no one thought of their education. Yet there were a number of blind people who, by reason of their own personality and efforts, distinguished themselves and rendered service to the world. Two notable examples in England were Saunderson (1672-1739), who became a professor of mathematics at Cambridge, and Blacklock, born in 1721, who became distinguished for his literary ability. On the Continent, Weissenburg, born in 1756, was a mathematician, and Fräulein Paradis, born in 1739, a distinguished musician.

The first school for the blind was established by the efforts of Valentine Hauy (born in 1745) and whose school was opened in 1783. He studied all the various individual efforts which had been made, and tried to establish a system. The school was formally recognized in 1815, and handicrafts were taught. Yet not more than 5% of the students were able to support themselves. One of them, however, Claude Montal, managed to purchase an old piano, studied its construction, and opened the occupation of piano tuning to the blind.

In England the first school was established at Liverpool by Rushton, who was at one time totally blind and later partially blind. Subsequently schools were established at Edinburgh, Bristol and elsewhere. Up to somewhere about 1850 all these schools had almost entirely a religious objective, the object of the supporters being so to educate the blind as to save their souls. Without biblical knowledge it was thought that they were in peril. The training was by word of mouth, and then raised maps made their appearance and touch was employed. Hauy in some manner taught his pupils ordinary script. All those concerned in the education of the blind were dominated by the idea that blind and seeing pupils were to be educated together, and that the blind must not be segregated, otherwise they would become morbid—a sympathetic view, but a definite obstacle to progress.

But at this stage the essential to sound education, namely, reading and writing together, was faced. All sorts of devices for rendering types readable by the fingers were studied with immense perseverance. Depressed and elevated types, and even a system of reading by knots on a string were tried in many ways. Tactile arithmetic was taught by a system of a board with holes and pegs. The ingenuity and energy shown by individuals is past praise. Gall modified Roman type so as to make it more easily tactable, and in 1834 published the Gospel of Saint John. Gall departed from his own theory so far that his modified Roman letters could hardly be identified by those who possessed sight. Alston, great-grandfather of Mr. Malcolm Brodie, of Melbourne, published the Bible in 1840 in raised letters.

Next, Lucas devised a sort of shorthand which could be read with the fingers. Moon simplified Roman letters in cutting out the cross-bar of the "A" *et cetera*. But though most of the explorers used raised type, they were dominated by the fatal idea that any script must be read equally by the blind and the seeing. The publications were expensive. Thus the New Testament cost in 1860: in Lucas type, £1 11s.; in Alston type, £2; in Moon type, £4 17s. The Old Testament cost: in Lucas type, £8 18s. 4d.; in Alston type, £7 15s.; in Moon type, £13 10s.

Such was the position and such the outlook when Louis Braille (born in 1809) appeared on the scene. Little is known of the steps which led to his solution of the difficulty. Barbier (born in 1809) had tried dots, and letters made of dots had been devised. He wanted a system which could be written. Braille seems to have studied these efforts, to have grasped the importance of both reading and writing, and finally to have broken away from the obsession that the writing must be read by both the blind and the seeing. The Barbier system used too many dots and was too complicated. Braille produced his system in 1824 and published an amended system in 1834. Mankind does not alter its outlook easily, and Braille initiated a struggle which lasted nearly a century. Many attempts were made to alter the Braille system, but it was finally confirmed, so far as Europe was concerned, at a conference in Frankfurt in 1882. But the struggle was not over. In the United States of America many variants appeared, notably New York Point and American Braille. In Great Britain a variety of Braille with contractions appeared, which was called Braille Grade 2, Grade 1 being the alphabet. At this stage, then, there were several kinds of Braille in the English-speaking world. Then the Americans, with their practical character, made a colossal experiment. They appointed examiners and examined thousands of writers of the various Braille systems in the United States of America, Canada, and Great Britain. Great Britain had decided to adopt Braille uniformly in 1905. In 1913 the examiners reported, to the surprise of many people, that the original Braille came out of the test as the best system. Five years later, in 1918, the Americans adopted the report and uniformity was established throughout the world. Thus the system has been stabilized for only fifteen years.

But the cost of printing was so great that all realized that written as well as printed books were necessary, and public-spirited honorary writers made their appearance. In Victoria these honorary transcribers of books have quietly and without public notice rendered and are today giving service of the first importance to the blind. The Victorian Library, assisted by the Edward Wilson ("of the Argus") Trust, is now of large proportions. A musical notation had been devised by Braille, and since 1911 a great deal of music has been published.

If vision, hearing and touch were cut off, the contents of the mind would shrink to a negligible

quantity. If one sense is lost, that of vision is the most serious deprivation, and Louis Braille stands out as the genius who rendered it possible to replace one sense by another and to open the door of education on a large scale to the blind. Whether something better will appear or whether mechanical genius will render printing and writing less expensive, less laborious and equally effective lies in the future.

But the three obstacles to progress have been swept away, namely: (i) The idea that the sole purpose of the education of the blind was religious in its objective. (It is now agreed that they should have at their disposal both religious and secular education.) (ii) That the blind and the seeing must be educated together. (iii) That whatever script was adopted must be read by the seeing and the blind equally well.

All honour to the memory of a man who did so much and curiously enough about whom so little that is personal seems to be known.

THE QUANTITATIVE EFFECT OF X RAYS ON MITOSIS IN THE MOUSE CARCINOMA (M.63).¹

By WM. H. LOVE, B.Sc., Ph.D.
Department of Cancer Research, University of Sydney.

THE work to be described forms a continuation of an investigation commenced some two years ago in *l'Institut du Radium*, Paris.

Experiments and Results.

In each experiment six tumours were selected, in accordance with a technique previously described.⁽¹⁾⁽²⁾ Three were submitted to the action of a measured dose of X radiation, while the remaining three served as controls.

The irradiations were made with a Coolidge tube, excited by a Gaiffe-Gallot Pilon generator working at 100 kilovolts; the rays were filtered by 3.0 millimetres of aluminium plus 0.25 millimetre of copper, and the dose was measured with a Solomon ionometer. At the termination of each irradiation the tumours were allowed to remain undisturbed in the body of the mouse for a period of two hours, when the irradiated and control animals were killed; small pieces of the tumours were then cut into thin sections, stained, and examined microscopically for mitotic content. The number of dividing cells in 200 different fields was enumerated for each tumour (irradiated and control), and in this way the mitotic survival was obtained for each dosage.

The mitotic survival is defined as the percentage number of mitoses that survive a given dose of

X rays. The results of the investigation are shown in Table I and are represented graphically in Figure I.

Dose in R units Number of dividing cells in 200 fields	0	100	150	200	250	300	400	500
Mitotic survival . . .	78%	57%	41%	33%	33%	23%	22%	
	78	57	41	33	33	23	22	

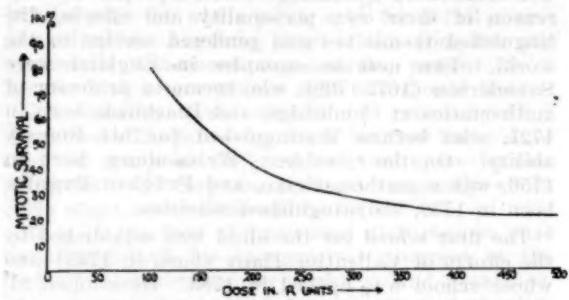


FIGURE I.

The general shape of this survival curve is similar to that obtained for the rat sarcoma of Jensen.⁽³⁾ The chief point of interest seems to be the flatness of the curve in the vicinity of a dosage of some 300 R units. This flatness means that the inhibition of a few more mitoses demands a relatively large increase of dosage. It thus follows that, so far as the inhibition of mitoses in this tumour is concerned, the use of large doses is relatively uneconomic. It is possible, and even probable, that this is another particular example of a more general proposition.

Acknowledgement.

I am indebted to Dr. Murray, of the Imperial Cancer Research Fund, London, for supplying me with the strain of mouse carcinoma employed in these experiments.

References.

- ¹ Wm. H. Love: "The Mitotic Activity of Normal and Malignant Tissues and Its Modification by X-Rays". *Journal and Proceedings of the Royal Society of New South Wales*, Volume LXVI, 1932, page 56.
- ² Wm. H. Love: "Sur une relation entre la fréquence des divisions cellulaires et la vitesse de croissance in vivo du sarcome de Jensen chez le rat", *Comptes rendus des Séances de la Société de Biologie*, Volume CVI, 1931, page 708.
- ³ Wm. H. Love: "Diminution du nombre des mitoses du sarcome de Jensen provoquée par les rayons X", *Comptes rendus des Séances de la Société de Biologie*, Volume CVII, 1931, page 1042.

Reviews.

DERMATOLOGY.

THE third edition of "MacKenna's Diseases of the Skin" has been enlarged and revised by Robert M. B. MacKenna, a son of the original author.¹ The preface indicates that

¹ "Diseases of the Skin: A Manual for Students and Practitioners", by the late R. W. MacKenna, M.A., M.D., B.Chr.; Third Edition, revised and enlarged by R. M. B. MacKenna, M.A., M.D., B.Chr., M.R.C.P., M.R.C.S.; 1933. London: Baillière, Tindall and Cox. Royal 8vo., pp. 520, with 45 coloured plates and 149 illustrations. Price: 25s. net.

¹ This work was carried out under the control of the Cancer Research Committee of the University of Sydney and with the aid of the Cancer Research and Treatment Fund.

the work is for the use of general practitioners and students. In the main it admirably fulfills this purpose.

An aetiological basis is used for the classification of the various dermatoses so far as this is possible. Of great interest is the inclusion of seborrhoeic dermatitis amongst the diseases due to fungi. This is a bold step and the author gives some sound reasons for his heterodoxy.

Whilst all the commoner diseases are described, the rarities have rightly been restricted and a smaller print is used in their description. A prominent feature is the number of useful formulæ which are given in detail, but, unfortunately, the imperial system of units is followed throughout even to the use of the obsolete drachm. The description of physical therapeutic agents is inadequate in view of their great use in dermatology. *Lupus vulgaris*, happily so rare in Australia, is given a large measure of attention; the author, however, does not mention the inhibitory action of natural ultra-violet rays in the prevention of this disease.

In the discussion of the treatment of *Lupus erythematosus*, intramuscular injections of bismuth are preferred to the more usual gold salts. It is suggested that when gold salts are being administered intravenously, the patient should be confined to bed for forty-eight hours at least following the injection. Surely this is an extremely conservative view, as thousands of gold injections have been given in hospitals all over the world in out-patient departments without trouble.

Useful practical hints are given for the management of *acne vulgaris*. A special paragraph is devoted to X ray therapy of *acne vulgaris* from which it would appear that the old fashioned gas tubes and not modern hot cathode tubes are recommended.

Senile keratoses, so important in Australia as the frequent precursors of cancer of the skin, are not mentioned.

Rodent ulcer is briefly mentioned. Free excision, if possible, is said to be the best treatment; surely this is not in line with modern thought. The radium dosage suggested is inadequate and one can understand the authors' preference for free excision, as he must have a large proportion of recurrences if he really uses the doses he advocates. X rays are also recommended, with the statement: "The dosage should be massive, a full pastille dose repeated thrice at intervals of 21 days." To describe this dosage as massive is wrong; it is far too small.

Squamous-celled epitheliomata are briefly mentioned and free excision is recommended; no mention is made of radiotherapy.

Numerous colour plates and photographs are included in the text, all of which are good and well selected to represent the various diseases.

An appendix gives directions for the preparation of starch and boric poultices, baths, and some additional local applications for various diseases. An excellent index is provided.

NOTES ON GROWTH.

THE late Professor James Lorrain Smith left behind him, in manuscript, the rough draft of several chapters of a book which he proposed to write on the subject of growth. His friend, Dr. J. S. Haldane, who frequently discussed the subject with Professor Lorrain Smith, has been persuaded by the latter's family to edit the uncompleted fragment for publication.¹

Dr. Haldane tells us that Professor Lorrain Smith's intention was to propound a philosophy of growth that was in harmony with Dr. Haldane's own belief as set forth in his various writings on the philosophy of biology. Unfortunately, the author died before he was able to

approach his subject from this angle and, although the editor has written a chapter which very briefly summarizes what he believes to have been the author's views, this chapter seems to have little relation to what is actually presented in the book.

The volume opens with a consideration of the general nature of the growth of cells and then takes up the growth of individual tissues and of tumours. It gives an elementary account of tissue embryology and histology, which, while it is too technical for the layman, contains little that is not well known to every medical student. The published chapters are very incomplete and contain many sentences which obviously have been merely jotted down to remind the writer of ideas to be pondered over at his leisure or discussed at greater length during the preparation of the work for publication. These defects are so grave and so numerous that we find ourselves regrettably obliged to express our opinion that the book, in its present state, is of little value.

SEX.

THAT wise and kindly counsellor, Havelock Ellis, has published a book entitled "Psychology of Sex"; it is described as a manual for students.¹ His "Studies in the Psychology of Sex", a work of seven volumes, is well known. The present volume is intended to serve as a concise introduction to sex psychology; it is not intended to supplant or even to summarize the larger work. The author in his preface deprecates the suggestion that in the larger work he has dealt chiefly with the pathological side of sex; he claims that he was concerned mainly with the normal phenomena of sex, and that in the present volume he has adopted the same attitude. With this we agree. In all his discussions he tries to show where the normal passes into the pathological. He shows quite clearly that without such a knowledge it is quite impossible for anyone to suggest measures likely to be effective in dealing with sex problems as they affect the individual. We may state at once, then, that this book is one which should be in the hands of all medical practitioners. Many practitioners do not realize how largely the lives of their patients may be influenced by problems of sex. Even if they had this realization, a large number of them would be at a loss to know how to act in a clinical emergency. This book, marked as it is by sanity, understanding and a sympathetic outlook, may be taken as an authoritative guide.

After a short introductory chapter, the author discusses the biology of sex. After dealing with the physical basis of sex, the author discusses the nature of the sexual impulse. He shows that tumescence and detumescence are not two distinct processes, but one process with two phases; he demonstrates the importance of recognizing this fact. Towards the end of this chapter he discusses in turn the factors of sexual selection, touch, smell, hearing and vision. Under the heading of vision the discussion of beauty in relation to sex is most interesting. While it is not possible to discuss the connotation of what the author calls that "richly laden word" beauty, it is important to note that the sexual and extrosexual factors of beauty have always been interwoven as far as man and his immediate ancestors are concerned.

The section of the chapter on the sexual impulse of youth which is of most practical interest is that on masturbation. The author states that it is so widespread a phenomenon that we cannot strictly speak of it as abnormal. He points out that while the practice of masturbation may be harmful in its consequences, it is also, in the absence of normal sexual relationships, frequently not without good results. Robie is quoted as having held that masturbation in certain circumstances had a thera-

¹ "Growth", by the late James Lorrain Smith, M.D., LL.D., D.Sc., F.R.S.; Edited by J. S. Haldane, C.H., M.D., F.R.S.; 1932. Edinburgh: Oliver and Boyd. Demy 8vo., pp. vi + 22. Price: 6s. net.

¹ "Psychology of Sex: A Manual for Students", by Havelock Ellis; 1933. London: William Heinemann (Medical Books) Limited. Sydney: Angus and Robertson, Limited. Demy 8vo. pp. 344. Price: 19s. net.

peutic value. The author states, and rightly, that this doctrine needs much qualification. "The physician's attitude should be one of sympathetic comprehension, but only the individual himself can decide what course of action best suits his temperament and circumstances." The author agrees with Wolbarst that a point may be reached when the impulse to masturbation should not be restrained. He also approves Wolbarst's statement that it is not possible to command those "moralists" who approve of masturbation as a method of preserving an imaginary "virtue". This subject is one of extreme difficulty. While many experienced medical practitioners will agree with the views held by Havelock Ellis, they would need to be careful when and how they expressed them, lest some who had not acquired the habit of masturbation might thereby be led to undertake the practice. It is our wisest course, in Ellis's opinion, to recognize the inevitability of sexual and transmuted sexual manifestations under the perpetual restraints of civilized life and while avoiding any attitude of excessive indulgence or indifference, to avoid also any attitude of horror, for our horror not only leads to the facts being effectually veiled from our sight, but itself serves to manufacture artificially evils that may be greater.

The chapter on homosexuality is largely a plea for greater understanding. It is impossible in the space at disposal to discuss this subject adequately. It must suffice to state that after discussing the many vaunted methods of treatment, the author states that the general health of the subject must be maintained and that physical and mental hygiene must be cultivated. "The inversion will not thus be removed, but with intelligent comprehension and sympathy the anxiety it causes may be allayed, its excesses may be restrained, and it may be brought under rational self-control. This is in most cases all that is necessary, and in many all that is desirable."

In conclusion, reference should be made to the chapters on marriage and the art of love. Here the author gives much advice which will be useful to medical practitioners in the consulting room. All life is, writes Ellis, an art. Art must not be confused with aesthetic sensibility. The art of living must be cultivated; it is worth cultivating. By reading this book medical practitioners will discover some ways in which their own artistry may be improved and in which they can help others to do the same.

Notes on Books, Current Journals and New Appliances.

PROGRESS IN MEDICINE.

"THE MEDICAL ANNUAL" for 1933 has been published.¹ It is planned on the same lines as previous volumes. For medical practitioners who do not know this publication, it should be stated that it is what the publishers state it to be: "A Year Book of Treatment and Practitioner's Index." The conditions dealt with are considered in alphabetical order. All important communications on different subjects made during the preceding year are summarized. Different sections are in charge of editors known to be expert in the subject of the section. Illustrations are reproduced, some of them in colour, from journals in different parts of the world, and these are valuable in conveying the message of the original authors. When the work of several authors in a subject is summarized, the result is often a comprehensive statement of present day knowledge of that subject. In this instance we can, as we have done in previous years, recommend the volume to the constant care of every practising physician, surgeon and specialist.

¹ "The Medical Annual, 1933", edited by Carey F. Coombs, M.D., F.R.C.P.; and A. Rendle Short, M.D., B.Sc., F.R.C.S.; fifty-first year; 1933. Bristol: John Wright and Sons, Limited. Demy 8vo, pp. 745, with illustrations. Price: 20s. net.

BOOKS ON SEX AND MARRIAGE.

DURING the past few years many books on sex and marriage have been published. Some of these have been extremely valuable; others, while useful, have followed the stereotyped pattern and have apparently been published because there is a market for these publications. The books to which attention is here drawn have certain features which will make them useful for different types of person.

Dr. M. J. Exner, in "The Sexual Side of Marriage", deals effectively with maladjustments and failures of the sex relationship in marriage.² His advice is on the whole sound, but we cannot agree with him when he writes: "Harmony and mutual satisfaction in the sexual sphere is likely to be the sustaining vital breath of the marriage-as-a-whole."

Dr. C. B. S. Evans, in "Man and Woman in Marriage", writes for the totally uninstructed.³ He gives advice regarding the sexual act which is suited for these people; he does not lay sufficient emphasis on the spiritual union of married people. Dr. Norman Haire writes a sane and useful introduction.

Dr. A. Buschke and Dr. F. Jacobsohn, in "Introduction to Sexual Hygiene", translated from the German by Eden and Cedar Paul, cover most of the ground indicated by the title of the book.⁴ The work will be useful to the more educated type of reader. The section of abnormalities of the sexual life is poor and makes the reader wish that this subject had been omitted. There are few writers on the subject with the wisdom, erudition and kindness of Havelock Ellis.

Dr. Enid Charles, who, by the way, does not hold a medical qualification, in "The Practice of Birth Control", makes an analysis of the birth control experiences of nine hundred women.⁵ The information has been collected by the Birth Control Investigation Committee. Some of the women attended the Birmingham Women's Welfare Centre. This is a book for medical practitioners and serious students of contraception.

THE MEDICO-LEGAL AND CRIMINOLOGICAL REVIEW.

THE Council of the Medico-Legal Society of Great Britain has issued the first number of *The Medico-Legal and Criminological Review*. This journal will record the transactions of the Society, and in addition will contain abstracts of current medico-legal literature together with reviews of books having a medico-legal interest. Lord Riddell, the President of the Medico-Legal Society, writes a foreword to the first number; and articles are published by Dr. R. Henslowe Wellington, "A Retrospect"; Sir John Collie, M.D., "Medico-Legal Practice"; Dr. F. J. McCann, "The Medico-Legal Significance of Impotence in the Male and Female". This journal will be published every quarter. The subscription is twelve shillings and six pence per annum. Messrs. Baillière, Tindall and Cox, of 7 and 8, Henrietta Street, Covent Garden, London, W.C.2, are the publishers.

² "The Sexual Side of Marriage", by M. J. Exner, M.D.; 1932. London: George Allen and Unwin, Limited. Demy 8vo, pp. 252. Price: 6s. net.

³ "Man and Woman in Marriage", by C. B. S. Evans; 1932. London: John Lane the Bodley Head, Limited. Demy 8vo, pp. 79. Price: 5s. net.

⁴ "An Introduction to Sexual Hygiene", by A. Buschke, M.D., and F. Jacobsohn, M.D., translated by E. and C. Paul; 1932. London: George Routledge and Sons, Limited; Australia: Angus and Robertson. Demy 8vo, pp. 201, with illustrations. Price: 11s. net.

⁵ "The Practice of Birth Control: An Analysis of the Birth Control Experiences of Nine Hundred Women", by E. Charles, M.A., Ph.D.; 1932. London: Williams and Norgate, Limited. Demy 8vo, pp. 190. Price: 10s. 6d. net.

The Medical Journal of Australia

SATURDAY, JULY 15, 1933.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

THE FOURTH AUSTRALIAN CANCER CONFERENCE.

In this week's issue is published an account of the Fourth Australian Cancer Conference, held at Canberra in March of this year. This conference is an important gathering and one that is possibly misunderstood by certain people. Its scope and purpose need to be emphasized once again. The conference, though called by the Commonwealth Department of Health, is not purely a government enterprise. It is called so that medical practitioners and physicists interested in both the theoretical and practical aspects of cancer research and treatment may look back on the work of the preceding year, discuss problems of common interest and formulate plans for the future. Admittedly a great deal of the time is taken up with discussions on the physics of radiation, but the clinical side is by no means neglected. It is significant that when a suggestion was made for the holding of the conference in two

sections, theoretical or physical and clinical, the members of the conference refused to entertain the idea. There is no doubt that study of the physics of radiation deepens the understanding of the clinician and engenders in him a respect for the followers of the science that makes radiation treatment safe for both patient and operator. In the same way the physicist who looks on radiations of different wave lengths as something having an effect on body tissues and not as mere laboratory phenomena, is more likely to be a complete scientist than if he cleaves solely to his laboratory. There is, however, a danger that these conferences may be looked on as conferences dealing with radium and X rays to the exclusion of other methods of treatment. This narrow view will not be taken if surgeons and diathermy experts join the assembly; for they will temper the enthusiasm of the radiators (if such a term can be applied to experts in radiation) with the feats of surgery, and incidentally they will be made to ask themselves whether their own zeal is not excessive.

In addition to asking for greater interest and cooperation in future cancer conferences, we would draw attention to one or two matters brought before the last meeting in what was one of the most important documents presented, a report from Dr. H. M. Moran. Dr. Moran's report was written by him after he had visited cancer clinics in England, Italy, France, Germany, Sweden and Belgium. He pointed out that there are in different races definite variations of incidence and site of cancer. He suggested that by a comparison of the habits and conditions of different races some of the causes of cancerous growth might be revealed. He therefore recommended that a research scholar should be appointed to undertake a scientific investigation of the incidence of cancer in Australian aborigines. This recommendation was not discussed at the conference. Had it been discussed, there is little doubt that the conference would have agreed that such an investigation would be worth while. The difficulty would have been to suggest means of financing such a project. Many would say, and with justification, that here was an investigation of international importance and that endeavours

should be made to secure a grant from such a body as the Rockefeller Foundation. Another way of carrying out such a proposal would be to utilize some of the money that has been subscribed all over Australia for cancer research. Physical research and research in treatment are at present absorbing most of the money that is being spent on work in cancer. If every cancer organization in Australia, in a quota proportionate to its resources, were to subscribe an annual sum, the expenses of a research scholar would easily be met and useful information might be gained. Such an investigation would be aimed at discovering the cause of cancer. It would not be, like so much of the present research in treatment, directed at improving methods for the relief of sufferers.

Two other questions discussed by Dr. Moran must be mentioned briefly. He had much to say about the education of the public, and while he stated that the *Krebspanik*, the cancerphobia, of German authors was a very real affliction, he showed that careful instruction of the public was productive of good results. He insisted that the plan of education should be continuous and that the controlling body should be permanent. It is satisfactory that a committee has been appointed to draw up a scheme for presentation to the next conference. The personnel of the committee is such that medical practitioners may have confidence that no scheme suggested by it will be likely to cause a cancerphobia or be so insecurely planned as to be ephemeral.

Dr. Moran's third contention covers such a large field that it can merely be mentioned. He pointed out that surgery of malignant disease demanded expert skill and that the application of radium to malignant disease could be done successfully only after a period of intensive training. He pleaded for legislation to control the occasional operator and the *dilettante* (delightful word) in radium therapy. This question is a large one and demands a separate discussion. At the same time it must be stated definitely that, in spite of any legislation that might be enacted, nothing but an active conscience will prevent a medical practitioner from undertaking work that he is incapable of doing as it should be done.

Current Comment.

ASTHMA.

DESPITE the many advances made within recent years, asthma remains a mysterious disease. Ignorance is cloaked in the term "allergy"; and, concerning the process determining a state of allergy, scarcely anything is known. Tests of skin sensitivity are of value in many cases; but they are not generally as valuable as they were at first thought to be by many; perhaps the fault is more in their application and the preparation of suitable antigens than in the tests themselves. Oriel's work, which has been discussed in these pages on several occasions, has been of very great importance in the advancement of the knowledge of asthma and other allergic disorders. A great deal remains to be learnt. There is yet no easy path to the discovery of the specific causal antigen, nor to the cure, of asthma; but a great deal can be done for the asthmatic in most cases, even if no specific antigen is found. Proof of this is shown in a recent interesting paper by Hugh W. Acton and Dharmendra.¹ These observers investigated 150 patients suffering from asthma, with the object in each instance of discovering the specific cause so that a rational treatment could be carried out. They found that their cases could be divided into three clinical groups. In the first group (comprising about 53%) were those due to chronic bronchitis, bronchiectasis or other chronic lesion of the lung; there was no evidence of allergy, and the age of onset was usually over 20 years and often over 30 years. In the second group they placed those (18%) in which certain Gram-negative bacilli could be found in the sputum and isolated by culture; there was a high grade of eosinophilia, in contrast with the usually low eosinophile cell count in the first group. The third group was the allergic group, containing asthma due to some external allergen or an allergen from the gut, and bronchial asthma in which there was some evidence of allergy; this group contained 30% of the cases; as a rule eosinophilia was pronounced.

Acton and Dharmendra found that in their allergic group Arneth's count was unaffected, whereas in the bronchitic group and the group of asthmas due to the Gram-negative bacillus, there was usually a pronounced shift to the left. In an assessment of the value of this and the eosinophile cell count as aids in differential diagnosis, it should be taken into consideration that Acton's and Dharmendra's observations were made in a tropical country where either of these counts may be abnormal apart from any allergic or bronchitic disorder.

Radiological evidence of pulmonary tuberculosis was found in 18 cases. In 13 of these, old and healed lesions only were found. The eosinophile cell count was above normal in eight. It is of interest to note that there was no reaction to the von Pirquet

¹ *The Indian Medical Gazette*, April, 1933.

test in four cases in which healed lesions were observed.

In the bronchitic group it was usually possible to control the asthmatic paroxysms by the administration of a powder of aspirin, phenacetine and caffeine; morphine was required occasionally. In the second group either a similar powder by the mouth or adrenaline solution hypodermically was used. In the allergic cases adrenaline solution was employed with satisfactory results.

There were 35 European and 115 Indian patients. Thirteen of the Europeans and 31 of the Indians were placed in the allergic group. Three of the Europeans and 19 of the Indians suffered from asthma caused by some excitant in the gut; the remaining ten Europeans and twelve Indians were affected by some external excitant. Acton and Dharmendra remark on the relative infrequency of allergy among Indians and the relatively greater importance among them of intestinal infection as a cause of allergy when it does occur. This is in accord with the findings of investigators in other countries with large aboriginal populations.

Of 98 patients treated, only five were unrelieved. Those suffering from bronchial asthma were given a course of injections of vaccines prepared from their sputa; those suffering from asthma caused by the Gram-negative bacilli were given a vaccine of these organisms. Patients suffering from asthma due to sensitivity to substances in the gut were given emetine, carbon tetrachloride or an auto-gogenous vaccine from the faeces, according as the exciting condition was one of amebiasis, ankylostomiasis or a sequela of dysentery. When asthma was due to an external allergen treatment consisted in avoidance of the cause, or desensitization.

In a separate paper in the same journal, Acton and Dharmendra give a careful description of the Gram-negative bacillus mentioned as a cause of asthma.¹ The organism appears in the form of short, thick, straight or slightly curved rods, singly or in pairs or short chains. In culture it may be diplococcal or filamentous. It is non-sporing and non-motile. It is not stained by Gram's method, and is not acid-fast; it appears to have no capsule. It grows well on ordinary media at room temperature in Calcutta (27° to 32° C.) and at 37° C. The appearances of the colonies on various media, and the action on various sugars are given in detail. It is non-pathogenic when given intraperitoneally or intravenously to mice, rats or rabbits. Specifically it most closely resembles the organism of fowl typhoid, and it bears a superficial resemblance to Friedländer's bacillus. Acton and Dharmendra have not been bold enough to give it a name.

It has been suggested that the organism causes asthma in man by the production of histamine-like substances. Acton and Dharmendra were unable to find evidence of the production of histamine by any of the strains investigated by them.

Further study is necessary before the importance of these Gram-negative bacilli can be appreciated.

Acton and Dharmendra deserve commendation for the thorough manner in which they have conducted their inquiries. They have done a service also in reminding medical practitioners that asthma is not necessarily due to an external allergen and that much can be done for the majority of asthmatics by investigation and treatment along common sense lines. It is noteworthy that they do not discuss more general treatment, such as the correction of hypoglycemia and hypocalcaemia *et cetera*; possibly their results would have been even more satisfactory if they had paid more attention to this aspect.

A NEW BIOLOGICAL TEST OF PREGNANCY.

A new procedure in the biological diagnosis of pregnancy is reported by K. Ehrhardt and K. Kühn.¹ They used a small variety of carp. In the female the ovipositor hangs outside the abdomen and when spawning occurs is about twenty to thirty millimetres in length; later it shrinks to three or four millimetres. When five cubic centimetres of urine from a pregnant woman are added to one litre of water in which the fish are kept, a remarkable increase in length of the ovipositor is noted within twenty-four hours, and the increase reaches its maximum within forty-eight hours. No reaction occurs if the urine be boiled before use, and this, the authors state, proves that the reaction cannot be due to anterior pituitary hormones, but to those from the ovary. Similar failure to react was noted after the addition of adrenaline and insulin. A positive result can be obtained from the urine of non-pregnant women. Ehrhardt and Kühn emphasize that while a positive result does not determine whether a patient be pregnant or not, a failure to react excludes pregnancy. Owing to the short period required for the test, it may prove a valuable aid to the Aschheim-Zondek and other tests for pregnancy.

THE HOBART CONGRESS.

MEMBERS of the British Medical Association in the six States of the Commonwealth of Australia and in the Dominion of New Zealand are reminded that the Fourth Session of the Australasian Medical Congress (British Medical Association) will be held in Hobart from January 15 to 20, 1934. Those who have applied for membership are asked to talk of the congress to their friends and to induce them to join. All who intend to apply for membership are urged to do so without delay. The available accommodation in Hobart is not great, and those who do not apply now may find difficulty later on in finding accommodation to suit their requirements. Dr. E. A. Rogers, Macquarie Street, Hobart, the Secretary of the Accommodation and Transport Committee, will be glad to give information to intending members.

¹ *Ibidem.*

¹ *Monatsschrift für Geburtshilfe und Gynäkologie*, April, 1932.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

The Absorption and Excretion of Water.

A. KLIBIECKI, M. PICKFORD, P. ROTHSCHILD AND E. B. VERNEY (*Proceedings of the Royal Society*, April, 1933) have traced the course of water absorption in the normal dog and have found that 35 minutes is the average time required for the absorption of 250 cubic centimetres. This figure agrees well with the average obtained by an analysis of data available in the literature, namely, thirty-six minutes. In the present investigation a method which allows the collection separately of urine from each kidney has been employed. From measurements of the time relations of water absorption and of the excretion of water by the kidneys and respiratory tract the time course of changes in the water content of tissues and tissue fluids has been deduced. The maximum quantity of water is present in the body some fifteen minutes before the diuresis which follows ingestion of water reaches its peak. When diuresis is at its height the extra water in the body has already fallen to 75% of its maximum value. Sometimes there has been observed a disparity between the responses of the two kidneys, the diuresis in one preceding that in the other. In any one animal the same kidney does not always show the first response. Apparently part of the mechanism causing the delay between absorption and excretion of water is located in the kidney. Division of the nerves on the pedicle of one kidney does not affect the parallelism between the responses of the two kidneys. It is unlikely that the renal nerves can modify the response by transmitting afferent impulses, as division of both right and left splanchnic nerves does not affect the course of the diuresis. Water ingestion does not alter the rate of chloride excretion, and after denervation of one kidney the rates of chloride excretion on both sides maintain a close parallelism. Mild exercise has been shown to inhibit water diuresis even when absorption from the intestine is complete before the commencement of the exercise. Such an inhibition is independent of the nerve supply to one or both kidneys, is accompanied by a rise in the concentration of chlorides in the urine, and reaches its maximum degree a few minutes after the exercise has ended. Bilateral division of the splanchnic nerves proximal to the suprarenal glands does not remove the inhibitory effect, so that the inhibition does not appear to be the result of increased secretion of adrenaline. Starling and Verney showed in 1925 that the addition of adrenaline to the blood perfused through an isolated kidney inhibited the secretion, but that the inhibition was not accom-

panied by any increase in the concentration of urinary chloride. When one kidney has been denervated, the injection of an extract of the posterior lobe of the pituitary gland inhibits the diuresis following ingestion of water in both kidneys. The authors suggest that the inhibitory effect of exercise may result from an increased output of the antidiuretic principle of the pituitary. The rate of urinary secretion is normally held in check by an appropriate concentration of this hormone in the blood and the rate at which the antidiuretic hormone is liberated by the pituitary gland is determined by the excess water load of the tissues, falling and rising as the latter increases and decreases respectively. In view of the frequently observed reciprocal relationship between the rates of secretion of the kidneys and the salivary glands, the authors incline to the view that the water load of the tissues affects the pituitary not directly, but as a result of an action on the central nervous system. Differences in the rate of response of the two kidneys may be due to local factors which determine the rate of destruction of pituitary hormone previously stored in the renal parenchyma. Sufferers from *diabetes insipidus* show a shorter latency between the ingestion of water and the commencement of the resulting diuresis than do normal people. Such an observation is clearly in accord with the hypothesis of Verney and his colleagues.

The Influence of Foodstuffs on the Rate of Urinary Acid Excretion.

C. E. BRUNTON (*Journal of Physiology*, April, 1933) questions the validity of the doctrine of the alkaline tide in the urine following meals, and stresses the need not only for determinations of the titratable acidity per unit volume of urine, but for estimations of the absolute amount of acid excreted in unit time. If this is not done, simple water diuresis may simulate an increase in the alkalinity of the urine by a dilution effect. Meals consisting of single foodstuffs cause characteristic changes in the urinary acid excretion. Water diuresis frequently increases the total acid excretion, and a similar result occurs if 50 grammes of glucose are given as a 0.75 molar solution. Bananas, potatoes, beetroot and lima beans reduce the quantity of acid in the urine as compared with controls made at the same period of the day. Meat, rice, wholemeal bread and grape fruit cause little change from the fasting excretion, while raisins and prunes increase the output of acid. Combinations of foods produce an effect such as might be predicted from a summation of the actions of the constituents of the meal. No association can be found between the acid secreted in the gastric juice and changes in the acid excretion in the urine. The decreased acid output which has often been stated to follow the morning meal can be replaced by an increase in the total acid if the

ingestion of food be postponed for a few hours, so that the urine is examined at a time such that, if the subject had fasted, the urinary acidity would have been climbing to one of its daily maxima.

The Excretion of Protein by the Mammalian Kidney.

L. E. BAYLISS, PHYLLIS M. TOOKEY KERRIDGE AND DOROTHY S. RUSSELL (*Journal of Physiology*, March, 1933) have investigated the excretion of a number of proteins by the kidneys of anaesthetized cats and rabbits and by the isolated perfused kidneys of dogs. They conclude that the molecular weight of a protein rather than its chemical nature or biological relationships determines whether or not, if present in the blood stream, it will appear in the urine. Gelatin, Bence-Jones protein and egg albumin are excreted and concentrated, while serum albumin and globulin of the same and of other species, casein, edestin and haemocyanin are not excreted. Haemoglobin is excreted without undergoing much concentration only when its concentration in the plasma exceeds a certain threshold value. In general it would appear that proteins of a molecular weight less than about 70,000 are excreted while those with heavier molecules are retained. Histological examination of the kidneys shows no evidence of damage in those which have allowed protein to pass into the urine. In two experiments in which large amounts of egg albumin were excreted, many of the glomerular capsules have been found distended with a hyaline eosinophile substance, and in the tubules a similar substance has been seen. The presence in the space of Bowman's capsule of this substance suggests that it has been filtered from the blood through the glomerular epithelium.

BIOLOGICAL CHEMISTRY.

Vitamin C and the Suprarenal Cortex.

L. J. HARRIS AND S. N. RAY (*Biological Journal*, Volume XXVI, Number 6, 1932) discuss the previous work in the literature concerning the identity of hexuronic acid and vitamin C, and in a series of experiments show that the relative antiscorbutic activities of suprarenal cortex and orange juice are exactly proportional to the amounts of hexuronic acid which can be isolated from these two sources. They show that raw suprarenal cortex from the ox is a more powerful antiscorbutic than that from any natural source so far known, possessing three times the activity of fresh orange juice. The degree of activity was found to correspond precisely with the value predicted on the basis of the relative yields of hexuronic acid obtainable from the two sources. The antiscorbutic potency of the cortex can also be accounted for on the basis of its total hexuronic acid content as estimated chemically, provided certain

assumptions are made in the calculation. From the evidence of these experiments the authors conclude that vitamin C is either identical with hexuronic acid or is a substance possessing a close similarity to it in its distribution and in its chemical nature. In guinea-pigs, a species which resembles man and monkeys, but differs from many others, including dogs and rats, in being unable to synthesize vitamin C *in vivo*, when none is provided in the food, experimental work shows that the vitamin C activity of the suprarenal is lost with the onset of scurvy. It is supposed that vitamin C plays a special rôle in the physiology of the suprarenal. The occurrence of distinctive hypertrophic changes in the suprarenal in scurvy is in keeping with this conception.

The Influence of the Gonads on Protein Metabolism.

I. SCHREIE AND H. ZWARENSTEIN (*Biochemical Journal*, Volume XXVI, Number 6, 1932) have shown that injection of suspensions of testes or of testicular extracts in saline solution causes the high urinary creatinine of castration to decrease to the normal precastration level. The authors point out that the results reported in this paper, together with those in a previous paper, afford strong evidence in favour of the existence of an endocrine relationship between the testes and creatinine metabolism. From their results and the results of previous workers the authors suggest that the castration effect is an indirect one through the anterior lobe of the pituitary.

Liver Injury and the Conjugation of Benzoic Acid.

A. J. QUICK AND MARY A. COOPER (*Journal of Biological Chemistry*, December, 1932) found that in dogs obstructive jaundice produced by ligation and resection of the common duct did not effect the conjugation of benzoic acid. Chloroform anaesthesia was found to cause a temporary decrease in the synthesis of glycuronic acid. An Eck fistula gave inconstant results, but apparently produced no permanent effect on the conjugation of benzoic acid nor any constant effect on the production of glycuronic acid.

The Metabolic Activity of the Cells of the Trigeminal Ganglion.

E. G. HOLMES (*Biochemical Journal*, Volume XXVI, Number 6, 1932), in a series of experiments, has analysed the activity of what he calls the cell complex, that is, the cell body, dendrites and the junctional or synaptic tissue. Full details of the experimental methods are given. The results obtained show that the trigeminal ganglia of sheep show very poor powers of oxidation, although the cells contained indophenol oxidase. The author also proves that the power of the trigeminal ganglia of forming lactic acid from glucose is less than that of the white matter of the central nervous system. The author suggests

that oxidation and glycolysis in brain occur in the dendrites and synaptic structures, rather than in the cell bodies.

Fat Metabolism.

EVELYN B. MAN AND E. F. GILDEA (*Journal of Biological Chemistry*, December, 1932) have discussed the normal range of the serum fatty acids for man in the post-absorptive state and have compared them with values obtained by a modification of the Stoddard and Drury technique. They found that the ingestion of 3.5 to 4.0 grammes of fat per kilogram of body weight by nine normal men and women produced a marked rise of serum fatty acids and a moderate increase in the serum-phospho-lipids. The ingestion of a balanced meal containing at least 0.6 grammes of fat per kilogram and with carbohydrate plus protein, slightly exceeding the weight of the fat, was found to produce a rise in the serum fatty acids of normal men and women.

Ketosis During Fasting in Eskimos.

P. HEINBECKER (*Journal of Biological Chemistry*, December, 1932) presents a report containing the data secured from the analysis of urine samples collected from three Eskimo women during a seven-day fast. The results of the urine analyses are consistent with those reported by the author on two previous occasions. The first subject, N., developed a degree of ketosis during the first four fasting days, definitely below an average standard for other races. There was a pronounced increase on the sixth and seventh days to a level approximating more nearly that reported by previous investigators. The total volume and creatinine determinations for the fifth day point to a probable loss of urine, but assuming the actual amount secreted was double the amount collected, the total acetone bodies for the day would be only 0.7606 gramme. The ketonuria in this subject doubled in intensity daily during the fasting period. The second subject, E., showed more strikingly the ability of the Eskimo to fast without the development of any appreciable ketosis. There was an increase in the fermentable sugar in the urine on the fourth day, suggesting a breaking of the fast; the transgression, if it occurred, was slight, because the total acetone bodies for the day were increased over those of the previous day.

The low values for fermentable sugars in the urine during the remainder of the experimental period indicate that the subject was then fasting. In the case of the third subject, M., the very definite ketosis shown by her on the second and fourth days seemed unusual. The lessening of the degree of ketosis which occurred on the fifth, sixth and seventh days, with an accompanying diminution in the nitrogen excretion, seems to the author to warrant the interpretation that the subject's ability to oxidize fats to completion improved during the fasting period. Respira-

tory data were not secured in these experiments. Consistent with these findings, in the author's opinion, is the view that Eskimos can burn considerable fat to completion without the aid of carbohydrate.

Carbohydrate Metabolism in Human Trypanosomiasis.

A. WORMALL (*Biochemical Journal*, Volume XXVI, Number 6, 1932) discusses the previous observations on blood sugar values made in animals and man with trypanosomiasis and has investigated the blood sugar values and the glucose tolerance for natives with trypanosomiasis and for normal natives. All the blood sugar estimations were made by the Hagedorn and Jensen method. The results obtained on twelve sleeping sickness patients in Uganda and with suitable controls (natives not suffering from trypanosomiasis) over varying periods of time indicate that in man there is no general hypoglycemia during the earlier stages of the disease. In certain instances, however, the author found a definitely low blood sugar value, and these low values were significantly lower than the lowest value with a normal native. Treatment of these patients was found to give variable results in relation to the blood sugar; sometimes there was a rise, sometimes a fall, and in other cases no change in the level. With the patient with the lowest blood sugar values the injection of "Bayer 205", one gramme, resulted in a speedy return to normal values. No relationship could be demonstrated between the blood sugar level and the presence in, or absence from, the blood of trypanosomes. Glucose tolerance tests carried out on a few of the patients with trypanosomiasis do not suggest that there is in this disease a very marked impairment of the capacity of the liver to deal with glucose.

Diphtheria Toxin in Contact with Certain Surfaces.

P. J. MOLONEY AND EDITH M. TAYLOR (*Biochemical Journal*, Volume XXVI, Number 6, 1932) have reported the results on an investigation of the effects of glass surfaces on diphtheria toxin. They found that diphtheria toxin disappears from solution when the solution is in contact with a sufficiently large surface of paraffin wax, or of glass which has been first in contact with light petroleum, or of glass which has been heated in an air oven in close proximity to cotton wool or filter paper for one hour at 180° C. Glass cleaned with chromate-sulphuric acid solution and heated in the air oven at 180° C. for one hour was found to have relatively little effect on toxin solutions in contact with it. Similarly, diphtheria antitoxin disappears from solution in contact with a paraffin wax surface or with glass previously exposed to heated cotton wool. These workers consider it probable that the disappearance of toxin and antitoxin from solutions in contact with paraffin wax is due to adsorption on the solid surfaces.

British Medical Association News.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

Robinson, Mary Hallam, M.B., B.S., 1930 (Univ. Melbourne), Rannoch House, Pakington Street, Geelong.

Benjamin, Philip Joseph, M.B., B.S., 1930 (Univ. Melbourne), Melbourne Hospital, Melbourne, C.I.

Public Health.

CANBERRA CANCER CONFERENCE.

THE FOURTH AUSTRALIAN CANCER CONFERENCE was held at Canberra on March 1 to 3, 1933. The meetings were held in the Institute of Anatomy. At the opening session the chair was taken by the Honourable C. W. C. Marr, Minister for Health for the Commonwealth. Subsequently the chair was occupied by Dr. J. H. L. Cumpston, Director General of Health.

The delegates to the Conference comprised the following:

Commonwealth Department of Health: Dr. J. H. L. Cumpston, Director General of Health; Sir W. Colin MacKenzie, Director, Australian Institute of Anatomy; Dr. M. J. Holmes; Dr. F. McCallum.

New South Wales: Dr. F. P. Sandes, Director of Cancer Treatment, Cancer Research Committee of the University of Sydney; Dr. H. G. Chapman, Director of Cancer Research, University of Sydney; Dr. William Love; Dr. Constance D'Arcy; Mr. T. Wilkins; Professor D. Welsh; Professor H. R. Dew; Dr. W. W. Ingram, Dr. Clarence Read, Dr. Colin Edwards, Dr. L. S. Loewenthal (The Royal North Shore Hospital of Sydney); Dr. A. H. Tebbutt (The Royal Prince Alfred Hospital); Dr. Sylvia Bray (Sydney Hospital); Dr. H. M. Moran; Dr. E. H. Molesworth; Dr. A. T. Nisbet; Dr. Leila Keatinge; Dr. H. K. Porter; Dr. H. H. Schlink; Dr. Clement Chapman; Dr. F. A. Maguire; Dr. J. Gower Stephens; Dr. E. W. Frecker; Dr. W. Moppett; Dr. George Parker.

Victoria: Professor T. H. Laby, F.R.S.; Dr. C. E. Eddy; Mr. A. H. Turner; Dr. T. Cherry; Dr. Kaye Scott, Dr. R. D. Wright (Melbourne Hospital); Dr. Robert Fowler (The Alfred Hospital); Dr. J. O'Sullivan (Saint Vincent's Hospital); Dr. Tracey Bull (The Austin Hospital); Dr. T. F. Ryan; Dr. L. S. Kidd.

Queensland: Dr. E. S. Meyers; Dr. V. McDowall (Brisbane General Hospital).

South Australia: Dr. F. S. Hone, Director of Cancer Treatment, University of Adelaide; Dr. H. A. McCoy; Dr. L. Bull; Dr. B. S. Hanson, Dr. Colin Gurner (The Adelaide Hospital).

Western Australia: Dr. Everett Atkinson; Dr. John Bluett (The Perth Public Hospital).

Tasmania: Mr. E. J. Tudor; Dr. V. R. Ratten (The Hobart Hospital); Dr. W. P. Holman (The Launceston Hospital).

Federal Capital Territory: Dr. L. W. Nott (The Canberra Government Hospital); Dr. Moya Blackall; Dr. A. J. Cahill; Dr. C. C. Finlay; Dr. D. C. Henry; Dr. J. A. James; Dr. A. J. Mollison.

New Zealand: Professor E. F. D'Ath; Dr. P. Lynch (Wellington Hospital).

The Editor of THE MEDICAL JOURNAL OF AUSTRALIA was present.

In opening the Conference the Honorable C. W. C. Marr used the following words:

It is with the greatest satisfaction that I attend here today for the purpose of opening the Fourth Conference

in this series of cancer conferences which have already done so much good not only in bringing about a common understanding, but also in unifying and strengthening the fight against one of the great scourges of humanity. I am impressed by the fact that each of these conferences has been more profitable than the last, and I am encouraged greatly by a realization that, through these conferences, the accuracy and efficiency of modern methods of treatment have been steadily improved.

We are faced with a definite rise in the mortality rates from cancer and this fact is sufficient to call for the united resources of all who can in any way contribute to the campaign.

In 1928 the Commonwealth Government decided to buy a quantity of radium which was then, and may still be, considered as the purchase on a large scale of a remedy at that time comparatively untried. We have now four years of experience upon which to draw for our instruction and guidance. We have had time to formulate the beginnings of a national policy, and the Government acknowledges with great appreciation the wholehearted way in which all concerned throughout the Commonwealth have combined to insure that the principles which have been gradually adopted in the formulation of this national policy have been based upon sound experience and upon the full testing of each step before any further move has been taken.

There has been a tendency in all things, and especially in this particular matter, to look to the Commonwealth Government.

I would now remind you of certain cardinal facts which I should be glad if you would take into consideration during this conference.

The rise in the price of radium which has taken place since the Commonwealth purchased the original ten grammes emphasizes in the most definite manner the necessity of being satisfied that the style and type of mounting of each portion of the radium is that which is best calculated to secure the maximum profit from the use of the radium concerned. It is further important to explore the possibilities of the more extended use of treatment by X rays. This treatment is in the end less costly and it has the overwhelming advantage of being free from danger when it is not in use, the latter being one of the principal drawbacks of the use of radium, and I would, by repeating it, emphasize the importance of being sure of the value of each means of treatment which is from time to time adopted.

It is impossible that the Commonwealth Government should be more than a central focus for this great campaign; it will continue to maintain the radium which it has purchased and supplied, but it is extremely improbable at this juncture that it will undertake the purchase of more radium.

What is still required is organization. A skeleton of a national organization exists, but I would commend to you the possibility of making a better and more coherent system by the establishment of a definite organization in each State, including not only the scientific world but also representatives of business and large social activities. With such an organization in each State supporting the central Federal scheme, we should have, if the matter could be properly handled and developed, an irresistible impulse towards greater efficiency in the campaign against cancer. We may record the fact that since your last meeting Tasmania has established an active organization of this kind. The Commonwealth Government will continue to provide all the machinery for a national centre and do from time to time whatever is possible with the suggestions that are made to it to insure greater success in this work.

The Government will consider most sympathetically any recommendations from this and future conferences because, without question, they must continue in the future until we have secured at least a stationary condition in the cancer mortality curve.

I note with satisfaction that the delegates assembled here today include for the first time representatives from every State in the Commonwealth, and it is with especial pleasure that I welcome the two official representatives of the Government of our sister Dominion of New

Zealand, Professor D'Ath and Dr. Lynch, each distinguished in his own sphere and already well known by their work to the profession in Australia.

The Minister then retired and the chair was taken by Dr. J. H. L. Cumpston.

Dr. Cumpston referred to progress which had been made during the past year. He pointed out the increase in the cancer mortality rate which the last year had shown, and that the efforts made and the improving results of treatment had not yet succeeded in reducing the rate of increase in the mortality curve. He stressed the need, which the Minister had already indicated, of a definite organization in each State in order that all available forces might be marshalled in the campaign against this disease. Invitations for representation at the Conference had been sent to the various bodies in Australia interested in cancer control, including, the Federal Committee and State Branches of the British Medical Association, and in these invitations the objects of the Conference had been fully explained and a copy of the agenda included. Some of the State Branches appointed delegates, but the Victorian and South Australian branches refused the invitation. In the case of the Victorian Branch the refusal was based on the opinion of the Council that the Conference should be held "at centres more readily accessible to those interested in the treatment and research work on cancer". The Council of the South Australian Branch felt that the expenses of delegates to the Conference should be borne by the Government, and advised that until such time as the Commonwealth Government was prepared to pay the expenses of delegates they were unable to accept the invitation to send representatives. These replies indicated a want of appreciation of the nature and objects of the Conference and of its work. The Conference was called in order to bring together those who were deeply interested in the problems of cancer, whether from the point of view of research (physical or clinical), treatment, prevention or administration. The meeting of the physicians and radio therapists, for example, had already achieved important practical results, the physicians working on the problems which beset the therapists. The delegates to previous conferences had on each occasion almost unanimously decided that Canberra was the most suitable place to hold conferences of this kind. Although the Conference was called by the Commonwealth Department of Health, it was not a Government Conference, but a meeting of those whose interest and enthusiasm were sufficient to bring them together for the exchange of knowledge and experience for mutual benefit and the good of the community. It could not, therefore, be considered incumbent on the Government to pay the expenses of those who attended. Nevertheless the Government did bear considerable expense in carrying out many of the recommendations of the conferences, and in making itself responsible for the machinery of the Conference and the publication of its proceedings.

The Chairman then referred to efforts made in other directions to have the Conference removed from Canberra, and held in the State capital cities. He said that at the end of the Conference, when the agenda had been disposed of, the matter would be open for discussion from all aspects and for any recommendation the Conference might wish to make.

Developments in Connexion with Cancer Control.

Dr. M. J. Holmes (Commonwealth Department of Health) gave a résumé of the developments in connexion with cancer control during the last twelve months. In regard to the general organization for the control of cancer, Dr. Holmes said that the principal developments in New South Wales had been the establishment by the Minister for Health of New South Wales of an organization to develop cancer therapy at the Coast Hospital under the State Department of Health. A first instalment of radium had been made available by the University of Sydney Cancer Research Committee from its stock of Commonwealth radium, and it was expected that there would be close cooperation between the Department of Health and the Cancer Research Committee. In Victoria

no progress had been made in the establishment of a State organization. In Queensland the only authority holding Commonwealth radium was the Brisbane and South Coast Hospitals Board. The Queensland Cancer Trust, in addition to its main centre at the Mater Misericordiae Hospital, Brisbane, had established centres at Townsville, Cairns, Mackay and Rockhampton. In South Australia no change in general organization had occurred. In Western Australia a public appeal for additional funds to enable the radiotherapeutic centre at Perth to expand its work had been most successful. In Tasmania the northern division of the Tasmanian Branch of the British Medical Association had inaugurated an anti-cancer campaign. As a result of this campaign sufficient money had been raised to purchase and house a deep X ray therapy installation and to provide a permanent fund for its maintenance. An endowment had also been provided to carry on a campaign of public education and to make provision for indigent patients.

Provision of Treatment Facilities.

In New South Wales, in addition to the allocation of radium for the Coast Hospital, Commonwealth radium had been made available to the Royal North Shore Hospital of Sydney and to the Moorong Radium Centre in connexion with the Home for Incurables at Ryde. Additions had also been made to the stocks of radium at the other treatment centres, the Royal Prince Alfred Hospital, the Sydney Hospital and Saint Vincent's Hospital. The University of Sydney had allocated the sum of £4,000 for establishing a deep X ray therapy department at the Sydney Hospital and in addition had provided the running expenses of similar departments at the Royal Prince Alfred and Saint Vincent's Hospitals. At Saint Vincent's Hospital, Melbourne, an extensive new wing to be devoted to radium therapy was being built. This installation was the subject of discussion at the Third Cancer Conference of 1932. At the Austin Hospital, Melbourne, the number of patients treated with radium during the last eighteen months had been trebled. In Western Australia and Tasmania considerable expansion of treatment facilities would occur as a result of the recent successful appeals for funds.

Dr. Holmes said that one of the main difficulties throughout Australia lay in the inadequacy of bed accommodation. The number of patients applying for treatment was continually increasing and it was specially noticeable that more patients in the early stages of the disease were making application. He pointed out that great care had to be exercised in the allocation of beds so that patients with advanced malignant disease would not occupy beds for long periods to the exclusion of those who had a reasonable hope of recovery.

Case Records System.

Dr. Holmes said that the uniform system of case recording and of statistical compilation of results of treatment was working more or less satisfactorily. Up till last year the compilations covered only those patients treated with radium. Forms, however, had also been provided for the compilation of results of treatment by X rays and by surgery. In discussing the following up of patients after treatment, Dr. Holmes said that the number traced was smaller than in the previous year. He quoted the Adelaide Hospital records in which only 4·4% of all patients treated remained untraced. At the same time he pointed out that there still remained some hospitals which had no follow-up system and no record of the results of treatment. He deplored the incompleteness of the records of the results of surgical treatment.

Protection of Personnel.

In regard to the protection of staffs, Dr. Holmes said that at the several treatment centres where radium was used, the international recommendations were fully adopted. Photometric measurements of the amount of exposure to stray radiations suffered by members of the staff had been made at the several institutions. In all except one instance the result of this test was satisfactory. In this instance observations indicated that the undue exposure was the fault of the person concerned and not

due to inadequate protection devices. Blood tests were being carried out as a routine measure at intervals of one or three months; in some instances the basal metabolic rate was estimated at intervals of three months.

Developments in the Use and Application of Radium and Radon.

While not discussing the question of optimum screenage of radium and radon, which was to be dealt with later in a special report, Dr. Holmes said that during the year the Commonwealth radium had been completely checked and that conditions of its storage and handling had been investigated. Conditions had not been found entirely satisfactory in every case. A pamphlet dealing with the storage and handling of radium had been issued.

In regard to radon, increasing amounts were being used in Queensland and in Melbourne. The radon supplied by the Commonwealth Radium Laboratory was in flexible containers of any desired length up to twelve centimetres and with any desired screenage. For these reasons radon lent itself to great variations in technique. The demand for radon in Victoria was increasing at such a rate that the question of the employment of additional radium for the production of radon would have to be considered.

The Commonwealth Radium Laboratory.

In referring to the activities of the Commonwealth Radium Laboratory during the year 1932, Dr. Holmes said that 13,584 millicuries of radon were issued enclosed in 2,456 containers of various kinds to seven Victorian hospitals. An increasing demand had been made for radon needles with a screenage of 0.8 millimetre of platinum and during the year 1,038 millicuries had been issued in needles made entirely of pure gold. It was interesting to note that the more heavily screened needles had been found advantageous in treatment in certain sites; and this bore out the recommendation of the committee on screenage appointed at the previous Cancer Conference. The demand for needles with a screenage of 0.4 millimetre of platinum had decreased and the majority of needles issued had a screenage of 0.5 millimetre.

During the year some new apparatus had been manufactured at the Laboratory. This apparatus included that for the standardization of X ray dose metres, the manufacture of which had been undertaken by the Commonwealth Department of Health.

In order that more use might be made of the monel radium metres, which had been found unsatisfactory when needles had to be buried, a number of these needles had been placed in brass screens, the screenage thus being brought up to 0.5 or 1.0 millimetre of platinum. It had been found necessary to solder, end to end, a number of one milligramme unit strength needles in order to obtain longer needles. These converted needles appeared to be quite satisfactory.

Educational Aspects.

Dr. Holmes referred to the institution of a diploma in radiology at the University of Sydney, and said that it was a most important step towards obtaining the greatest therapeutic value from X rays and radium with a minimum of danger to the patient and the staff.

Review of Cancer Research for 1932.

DR. H. G. CHAPMAN, Director of Cancer Research, University of Sydney Cancer Research Committee, then gave a comprehensive review of the field of cancer research in Australia in 1932. He pointed out that in Sydney alone a very large number of original papers had been prepared covering the work of the Sydney University Cancer Research Committee staff alone. This was in addition to work at other research centres in Australia. It was impossible to give an adequate account of this large volume of work carried out over six years, the results of which were now accruing. He pointed out the necessity for economy in expenditure owing to reduction in income due to the reduced value of investments and indicated the necessity for making a selection of certain lines of research on which efforts should be concentrated.

DR. THOMAS CHERRY said that in Victoria during the past year research work into the causation of cancer and especially the relation of that disease to tuberculosis had been continued under the Cancer Research Committee of the University of Melbourne by himself and Dr. R. D. Wright. In mice inoculated beneath the cuticle with very small doses of virulent tubercle bacilli, the incidence of tumours in various parts of the body and of ulcers situated near the pylorus still remained fairly constant at about 30%. The year's work had confirmed the observations previously made, to the effect that the bacilli might remain in the tissues of the mouse for long periods, producing little apparent ill-health in the animal, but acting as a chronic irritant the influence of which might be traced in the marked multiplication of the lymphocytes in the blood, lymph glands, marrow and other tissues and organs. Dr. Wright had taken advantage of an epidemic of mouse typhoid in the stock to check the observations previously published by Dr. Cherry to the effect that ulcers surrounded by polymorphic leucocytes tended to repair, while those surrounded by lymphocytes tended to become malignant. His results, which definitely confirmed this proposition, would shortly be published.

As it seemed advisable that these results should be placed before experts with the widest available experience in mouse pathology, Dr. Cherry had proceeded to England in June, 1932, and had attended meetings of the Pathological Society at Oxford, of comparative anatomists and pathologists at Cambridge and the Centenary Meeting of the British Medical Association in London. At each meeting lantern and microscopic slides were demonstrated, and the material was studied in detail by a number of pathologists including Professor Aschoff, of Freiburg.

Dr. Cherry said that the following propositions expressed the views of most of the pathologists who had examined the material during his visits to London, Cambridge and Oxford:

- (a) This series of tumours was unique in the mouse.
- (b) The tubercle bacillus appeared to be an essential factor in their incidence.
- (c) They were in some ways more suggestive of human tumours than of the spontaneous tumours of the mouse.
- (d) The lesions of the stomach and duodenum were genuine ulcers. A decision as to their nature and malignancy involved difficulties similar to those present in the same problem in man.

Statistical Review.

Dr. Holmes pointed out that for the year 1931 the deaths from cancer in the Commonwealth per 100,000 of mean population were, for males 105, females 97, persons 101. These rates showed a considerable increase on those of the previous year. The increases in the mortality rate affected all States except Western Australia.

Of the total deaths from all causes in Australia the proportion due to cancer continued to rise, and in 1931 one death in every nine in males and one in every eight in females had been caused by cancer, this proportion being the highest yet registered in the Commonwealth.

A close study of the incidence of cancer mortality in Australia in relation to the age grouping of the population provided interesting conclusions. The population of Australia had, during the past fifty years, been altering considerably in composition as regards its age grouping. In 1881 only 2.5% of the population lay in the age groups sixty-five years and over. In 1931 6.03% of the population lay in these age groups. Whereas up till 1921 the population of Australia contained a smaller proportion of people aged sixty-five years and over than a standard population, by 1931 the position had become reversed and there was now a larger proportion of the population in age groups over sixty-five years than was the case in a standard population. Consequently an increasingly larger number of people was living into what was known as the cancer age.

It was found also that in that portion of the population living in age groups sixty-five years and upwards, the cancer mortality rate per 100,000 was rapidly increasing.

These two factors, an increasing proportion of the population surviving into the later age groups, and an increasing cancer mortality in these later age groups, combined to account for the upward trend of the cancer mortality rate.

On the other hand, it was found that in the age groups below sixty-five years, an actual diminution in the cancer mortality rate had become evident in recent years, the rate for 1931 being below that for 1911 and 1921. This diminution in the cancer mortality rate for the age groups under age sixty-five years might be considered as a favourable sign and might with justification be attributed at least partly to the efficacy of modern treatment. By this treatment not only might death be deferred in some cases into a later age group, but in persons who had not yet reached too great an age and in whom diagnosis was sufficiently early made, cure was obtained in a considerable proportion of cases, depending largely upon the site and type of cancer. In old people, on the other hand, cancer came more as a terminal event, cure was the less likely to occur, and the mortality rate was consequently but little affected by treatment.

The steady rise in the cancer mortality rate mainly appeared in relation to carcinoma of various organs. The mortality rate for sarcoma was at practically the same figure as it had been twenty-five years before, and there had been but little fluctuation in the interval.

In regard to regional cancer, the mortality from cancer of the tongue in males, although the year 1931 showed an increase over the previous year, still remained at a lower level than it had been a decade or two previously. In females, on the contrary, the mortality rate (although cancer of the tongue was relatively rare in females) was higher in 1931 than at any time previous in the past twenty-five years.

Although in cancer of the tongue in males the tendency of recent years had been towards a diminution in the mortality rate, in all other sites of cancer, with the possible exception of the skin, the mortality rate had increased. In respect of some regions, however, the mortality rate was increasing much more rapidly than in others. Thus in females the mortality rate from cancer of the breast had increased more rapidly than that for cancer of the female genital organs. This was indicated in the accompanying table:

TABLE I.

Site.	Rate per 100,000 of Mean Population.		
	Females.		
	1908.	1931.	Increase.
Female genital organs	15.8	20.9	36%
Breast	10.2	18.6	82%

The region in which the most rapid increase in the mortality rate from cancer had occurred was the digestive tract, oesophagus to rectum. Here the increase since 1908 had been 146% in males and 120% in females.

The mortality rate for males per 100,000 of mean male population in 1908 was 25.2, in 1930 49.7 and in 1931 62.0. For females the rates for the same years were 20.1, 35.9 and 44.3 respectively. In males in 1931 one death in every 1.7 deaths from cancer was attributed to cancer of the digestive tract. In females the proportion was one in 2.2.

In cancer of the skin the mortality rate which until 1918 rose steadily, had since shown a distinct though fluctuating tendency to fall. In 1908 the rate in males was 3.1 per 100,000 of mean population. In 1918 it had risen to 5.0 per 100,000. In 1930 it had fallen to 4.0 per 100,000 and in 1931 to 3.5 per 100,000.

Records of Cancer Treatment Centres.

In discussing the records of cancer treatment centres Dr. Holmes said that the records of results of treatment by means of radium, radon and radium combined with other methods were kept on strictly uniform lines, so that

the statistical material for all cancer treatment centres in Australia could be consolidated. A large mass of statistical material was now consolidated covering a period of four years. As regards treatment by means of X rays, a good start had been made in the keeping of records on uniform lines, thus providing for comparable statistical material which would be of the greatest value.

In regard to treatment by surgical operation, no considerable mass of statistical material was available, as in most hospitals patients treated by operation were not followed up in order to ascertain the end results of treatment. It was hoped that in following up patients treated by surgical methods the same care would be adopted as was adopted with patients treated by means of radium and X rays.

Referring to patients treated at the cancer treatment centres by means of radium or radium combined with other methods, Dr. Holmes said that the number of patients regarding whom information had been obtained for statistical consolidation for the period of approximately four years to June 30, 1931, was as follows:

Sarcoma	113
Carcinoma	3,526
Rodent ulcer	2,915

A large number of patients with tumours of doubtful malignancy and also with benign tumours had also received treatment.

Of the 3,526 cases of carcinoma, 1,731 were classified as operable. Of the patients with operable tumours 65% were, on June 30, 1931, alive and free of symptoms, 25% showed local improvement, 3% were known to have died of cancer, and in 8% the patient had been lost sight of and the end result was therefore in doubt.

Of 966 patients with inoperable tumours, 14% were alive and free of symptoms, and 41% were known to have died.

As regards rodent ulcer, of 2,652 patients whose ulcers were classified as operable, 75% were alive and free of symptoms, 0.2% had died, and in 9% the end result had not been ascertained. Of 167 patients with inoperable and advanced ulcers, 13% were alive and free of symptoms, 56% showed local improvement, and 32% had died.

As regards sarcoma, of 37 patients with operable sarcomas, 43% were alive and free of symptoms, 38% showed local improvement and 11% were dead. Of 57 patients with inoperable and advanced growths, 9% were alive and free of symptoms, 30% showed local improvement and 65% were dead.

Results of treatment by means of radium and of radium combined with other methods were good in cancer of the skin and of the lips and in operable tumours of the buccal cavity, uterus and breast. The proportion of cases of cancer treated by radium or radium combined with other methods in which the patients had not been followed up to ascertain the end results of treatment was considerably less than in previous years, so that the statistical data were becoming more accurate and consequently more valuable. With the passage of time permitting a longer interval to elapse between the application of treatment and the determination of the end results, the records would prove of the utmost value in enabling deductions to be made as to the relative efficacy of the various methods of treatment by means of radium or radium combined with other methods in cancer of different regions.

Now that a regular follow-up system was being employed in respect of patients treated by means of X rays, and a commencement was being made in some hospitals to apply the system to patients treated by surgical operation, data would be available which would enable useful comparisons to be made regarding the relative values of the various methods of treatment.

Case Records and Statistical Returns.

It was pointed out that the case sheet adopted by the Cancer Conference and printed by the Commonwealth Department of Health had been in use at all the treatment centres, and apparently proved satisfactory in general. In Sydney, however, it had been found necessary to use, in addition, a special type of record booklet for gynaecological cases.

As regards the classification of cancer for statistical purposes, the classification in use (operable, borderline, inoperable, very advanced) represented an attempt to classify results of treatment according to the stage of the disease. It did not suit every form of regional cancer, nor could much uniformity be expected in the interpretation of the terms by different treatment centres. The classification in fact was rough and inelastic. The Conference had already considered this, and it was suggested to the previous Conference that the classification of the stage of the disease might vary with the various types or sites of cancer, but it had been decided not to adopt this suggestion at present owing mainly to the expense that would be involved in the printing of special record forms or cards for each cancer site. Nevertheless, the system was open to amendment at any time. A suggestion had recently been made that the classification into operable, borderline, inoperable, and very advanced might be replaced by a classification according to prognosis, for example, good, borderline, bad. It had also been suggested that as regards the types of cancer, Ewing's classification of tumours or some modification of it might be adopted. These amendments were open to discussion by the Conference, but it was suggested that time would be saved if a permanent committee were appointed by the Conference to consider the matter and to report upon these and upon future suggestions regarding amendments. Alterations to the case sheet should be made only by resolution of the Conference.

As regards the statistical returns. These were, in general, compiled in a very satisfactory manner at most hospitals in respect of cases treated with radium. Some hospitals, however, had not adhered to the instructions issued and had introduced errors which resulted in their returns having to be discarded from the statistical consolidation prepared for the Conference. One form of error was that of including a case under more than one heading on the form, as, for example, both in the "Local Improvement" and in the "Local Improvement, Died of Metastases" columns. No case should be shown in more than one column.

The Third Cancer Conference recommended that hospitals should compile statistical returns of the results of treatment in respect of cancer treated with X rays, and the Commonwealth Department of Health prepared special forms for the purpose. These had been filled in by most hospitals in which deep X ray therapy was carried out, but the returns were, in general, not so complete as the radium returns were.

The Commonwealth Department of Health had also prepared forms for use in connexion with patients treated by surgical operation, but the response in filling these in was small because the follow-up in such cases was, in general, incomplete, and results of treatment were not available.

This year also, many hospitals had responded to the request to supply separate statistical returns of cases of regional cancer treated by means of radium alone, radon alone, radium in conjunction with X rays, and radium in conjunction with surgery. Special returns such as these were a goal towards which they must strive.

Dr. Holmes, who was speaking on this subject, said that he had been able in the statistical summary presented to give some indication of the consolidated figures based upon these numerous returns. The amount of statistical material consolidated was very great, and it was possible to give only the merest outline to the Conference. It was proposed to prepare a number of sets of the full consolidated tables in respect of every region of cancer, and to supply a set to each hospital furnishing returns. Thus the workers at each hospital would be able at leisure to compare their figures with the consolidated figures for all Australia for every site of cancer, whether treated by radium, X rays or surgery. As this would mean the typing of several hundreds of forms, these sets would not be available for some weeks, but they would be sent as soon as they were ready. The information was too valuable to be pigeonholed, and printing was too expensive.

As already stated, the amount of material sent in for consolidation by the various treatment centres that year had been enormous, and the greatest difficulty had been

experienced in handling it. It was suggested that each year in future a special region or regions be consolidated and a full compilation made in respect of these regions. Thus next year (1934) cancer of the breast and of the chest contents, lungs, mediastinum, *et cetera*, and bone cancer might be taken, and an intensive study made of the result of treatment by various methods and combination of methods, and the information transmitted to the Commonwealth Department of Health for consolidation. The clinical day of the Conference could then be devoted to cancer of these special regions. This would be better than a vast consolidation of results of treatment by various methods for all sites of cancer in the various stages of the disease such as was attempted that year at the Fourth Conference.

Workers in Adelaide had suggested that the return of patients treated from July 1 to December 31 be abolished. This return had no significance except as an indication of the volume of work going through the clinics and to bring the information for the Conference up to the latest moment.

In regard to follow-up systems, the statistical compilations this year showed a considerable improvement in the efficiency of the follow-up system as indicated by a reduced proportion of cases in the "Not Known" column. This, of course, referred to cases treated by radium. Nevertheless, there were hospitals which could give no information regarding results of treatment even of their radium cases.

The follow-up system was being extended to patients treated with X rays and in a few hospitals to patients treated by surgery. It was very necessary that the follow-up should apply to all cases of cancer, irrespective of the method of treatment employed. Radium and X rays were really still on their trial as remedies for cancer except in a few regions, and it could not yet be definitely stated that results were permanent. The application of these remedies was being experimentally extended to cancer in many regions in which formerly they were not used. Therefore, great care should be exercised in the follow-up so that results might be accurately assessed, and for comparative purposes the follow-up in respect of patients treated by surgery should be no less careful.

It was recognized that great difficulty was experienced in the follow-up of patients, especially when financial troubles led to a nomadic search for work. These difficulties threw a great strain on hospital staffs, but it was considered that the importance of the matter justified the establishment of more adequately staffed record departments in hospitals as a matter of urgency. Some of the money available for cancer organization and control could, with benefit, be applied to such a purpose as this. Dr. Holmes had recommended this point of view to Perth and Launceston, for example, where recently a successful appeal had been made to the public for funds.

The possibilities of the follow-up system were indicated in the case of the Adelaide Hospital where of all patients treated with radium to date only 4·4% remained untraced. Adelaide might aim at showing a similar result in respect of patients treated by other methods.

Resolution of Conference.

After discussion the Conference appointed a permanent committee to consider suggestions for the amendment of case sheets and forms for statistical returns and to report to the Conference. The following were appointed members of the committee: Dr. V. McDowall (Brisbane), Dr. F. P. Sandes (Sydney), Dr. Kaye Scott (Melbourne), Dr. B. S. Hanson (Adelaide), Dr. M. J. Holmes (Canberra).

Storage of Radium and Precautions against Loss.

It was reported that since the Third Conference, the Commonwealth Department of Health had completed a full check of the whole of the radium purchased by the Commonwealth Government, including that issued to the various authorities who held it for purposes of treatment or research. This investigation covered not only the checking of the radium containers, but also the measurement by means of an electroscope of the actual radium within the containers.

As a result of the investigation it was stated that the radium purchased by the Commonwealth Government was held in 2,169 containers with a total measured content of 10,035.36 milligrammes of radium. The containers were distributed among thirteen different centres.

Of this radium, a total of 25 containers with content of 66 milligrammes of radium had been lost in the four years since distribution was made. This loss was equivalent to 0.65% of the radium over a period of four years, an average of 0.16% per annum.

Although this loss might not be considered excessive considering the wide distribution of the radium, and the fact that it was in constant use, it was certainly for the most part preventible, and it was important to note that by far the greater part of that lost occurred in containers of the larger size (three ten-milligramme tubes were lost, two five-milligramme, one four-milligramme needle, and two 3-milligramme needles, totalling 50 milligrammes out of 66 milligrammes lost, or 76% of the total lost).

The value of the lost radium had been refunded to the Commonwealth Government by the institutions concerned under the terms of the agreement, so that the Government had not suffered financial loss, but the point was that a quantity of radium had ceased to be available for treatment purposes at a time when treatment requirements were expanding, and that the replacement value of the radium was now almost double the original purchase cost.

The loss, in at least some instances, was due to insufficient care in storage, handling or checking of the radium, and in some instances had not been reported to the Commonwealth Department of Health as provided for in the agreement, but only became known to the institutions concerned when the check was made by the Department. In other instances, the loss had not been reported until many months after it had occurred. This indicated a disregard on the part of some institutions of their obligations under the agreement which provided for a complete check of the radium at least once per month, and immediate notification of losses or deficiencies to the Commonwealth Department of Health.

Such disregard of the conditions under which the radium was issued on loan could not be permitted, and in order to build up a system of adequate care in the storage and handling of the radium, the Commonwealth Department of Health had distributed during the year a pamphlet relating to precautions against the loss of radium which, it was expected, would be carefully studied by institutions holding Commonwealth radium; it was also expected that the recommendations made therein would be applied as far as practicable or necessary in each case.

The system set out in detail in this pamphlet represented that established and successfully operated by one of the largest holders and users of Commonwealth radium in Australia, and which during the last two years had not lost any of its radium. This was sufficient indication that loss of radium was not inevitable, but was almost if not entirely avoidable.

Particular attention was drawn to the desirability that each institution using radium in any quantity should possess an electroscope for use in testing all dressings and sweepings from wards in which radium was used, in order to determine the absence of radium before such sweepings *et cetera* were destroyed.

The check indicated that, although some needles were bent and in some cases eyelets were damaged, the containers had, in general, received careful use and were in good order. This was also indicated by the fact that for the last year, the only repair work required of the Commonwealth Radium Laboratory was the replacement of foil on two plates, and the repair of a broken eyelet in one needle.

Attention was drawn to the fact that the Commonwealth Radium Laboratory in Melbourne was available for all repair work, and that damaged or bent needles and those in which the eyelet was damaged or too small for threading purposes, or in fact any containers requiring repair or alteration might be sent to the Commonwealth Radium Laboratory.

It was suggested that some member of the Conference might have some comment to make on the matter of the

storage and handling of radium, and on the system recommended by the Commonwealth Department of Health in the pamphlet which had been referred to. The pamphlet had been drawn up by a sub-committee in Melbourne following upon the appointment by the Second Australian Cancer Conference of a permanent committee. This committee was carrying on its work in other directions also, and the Conference would be informed in subsequent items of the agenda of the result of its activities.

Pathological Classification of Cancer.

The Third Australian Cancer Conference appointed a committee to consider the question of the pathological and statistical classification of cancer, and instructed it to regard as of primary importance the provision and distribution of reliable and practical advice to all persons in medical practice as to classification and site, with special respect to certification.

The committee consisted of Professor D. A. Welsh, Dr. F. P. Sandes and Dr. M. J. Holmes. This committee did not actually meet as a committee owing to illness and other causes, but the matter was discussed between the members.

Dr. Holmes pointed out that there were a multitude of difficulties from the point of view of fixing any accurate pathological classification, whether for statistical or any other purpose.

Competent pathologists differed widely in their views. Even differentiation between carcinoma and sarcoma was often in doubt. Different portions of the same tumour showed differences in structure. In determining the classification of a tumour much depended on the depth of tissue removed for submission to the pathologist. The clinical facts should always be taken into consideration and this required close association between clinician and pathologist which was often difficult to arrange. The papers to be read at that (the Fourth) Conference and the discussion on pathological examinations in relation to diagnosis and treatment would indicate many of the difficulties referred to.

As regards medical certification of deaths from cancer, statisticians had been consulted and some direct evidence had been obtained in regard to the reaction of the medical profession to an attempt to obtain further information and greater accuracy in regard to death certification. Mr. McPhee, Commonwealth Statistician, would inform the Conference of the difficulties encountered by the statistician.

Information regarding the site of cancer was usually well covered in the death certificates, and the result was that demography tables prepared by the Commonwealth Statistician were more complete from this point of view than tables prepared in any other country. The proportion of deaths in which the actual situation of the lesion was not specified by the certifying medical practitioner was very small, amounting in 1930 to 84 in a total of 6,120 deaths from cancer, little more than 1%.

As regards the pathological classification of the tumours, the position was much less satisfactory. The classifications adopted by Commonwealth and State statisticians did not agree, and this introduced difficulties in the preparation of the Commonwealth demography tables for Australia as a whole.

Although the ideal of obtaining from certifying medical practitioners a clear statement of the pathological nature of each tumour certified as the cause of death was very desirable, it was at present unattainable for the reasons already given. In many cases, facilities for pathological examination were not available, and even where they existed, the inadequacy of the specimens of material forwarded to the pathologist, the absence of close touch between clinician and pathologist, and the divergence of views of pathologists themselves in the absence of a suitable classification for guidance, vitiated the preparation of accurate statistical data.

Again, the accuracy of the conclusions to be drawn from statistical figures depended upon the mass of the figures themselves. If fine distinctions in pathological classifications were required of certifying medical officers, the mass of figures under the numerous separate headings of the classification would be too small for practical purposes.

The Commonwealth Statistician who, like the State Statistician, referred back to certifying medical practitioners any death certificate which did not give fully the required particulars, had informed Dr. Holmes that protests from medical men were frequent in respect of requests for additional information regarding the pathological classification of the lesion in cancer which, they said, they could not supply. One State Branch of the British Medical Association had even protested formally against demands made on medical practitioners in this respect. This referred to the pathological classification in use by the Commonwealth Statistician, and which was placed before the Third Cancer Conference, and which was a comparatively simple classification.

As regards the International List of Causes of Death, it was significant that no attempt had been made towards a pathological classification of causes of death from cancer. Classification was by site only.

It was considered that until widespread facilities were available to medical practitioners for pathological examination, and until pathologists reached greater unanimity in respect of classification, certifying medical practitioners should be asked to certify under a minimum list of headings.

When the cause of death was certified under indefinite terms such as "cancer", "malignant disease", "neoplasm", the certificate should be referred back to the medical practitioner for reference to one or other items in the short classification adopted.

As regards statistics of the incidence of cancer under more detailed pathological headings, Dr. Holmes was of opinion that this should be, for the present, left in the hands of the pathological departments of hospitals. The amount of material available in this way would be of far more value than anything which could be obtained by attempting to get from the general medical practitioners a statement on the medical certificate of death as to the exact pathological nature of the tumour, and as a large majority of cancer patients received treatment at hospitals, the hospital figures regarding pathological classification should cover the majority of cancer cases which occurred, and the large majority of the persons who died from cancer.

Dr. Holmes suggested that:

1. There should be a classification of cancer under a minimum number of headings for the use of certifying medical practitioners in connexion with the certification of deaths and for demography purposes.

2. There should be a detailed pathological classification of new growths for use in the pathological departments of hospitals. These departments would then constitute the mine from which could be drawn the mass of statistical data on which to base uniformity in diagnosis and in the treatment of cancer according to the nature of the tumour.

Mr. E. T. McPHER, Commonwealth Statistician, told the Conference something of his experience as Deputy Commonwealth Statistician for Tasmania.

In many cases the certificate furnished by the medical practitioner showed the cause of death as cancer or carcinoma with no further indication of the type of the disease. It was necessary, therefore, in order to comply with the requirements of the existing classification of causes of death for the statistician to refer such cases to the medical practitioner for further details. The practitioner quite frequently replied that it was impossible for him to diagnose the type without an autopsy and then a laboratory examination might be necessary. An autopsy in most cases was impossible because of opposition from the relatives of deceased, and a pathological examination of the diseased tissue would involve expense for which neither the medical man nor the relatives would accept responsibility. It was apparent, therefore, that under present circumstances, it was impracticable to get an accurate diagnosis of deaths in accordance with the existing extensive list of types of cancer. The medical practitioners in Tasmania felt that they were being asked to do the impossible, and they resented the interrogations of the statistician so keenly that the matter was brought under the notice of the local branch of the British Medical Association. It was pointed out to the statis-

tician that persistence in demanding an impossible refinement in diagnosis might merely induce a carelessness which might extend to causes of death other than cancer to the detriment of the statistics generally.

The Commonwealth Statistician, from his wide experience, recommended the suggestion that for the present research should be restricted to the experience of hospitals, where there were adequate facilities for a proper diagnosis, because in his opinion better results would be obtained from a smaller amount of reliable data than from a larger mass of doubtful material.

DR. LIONEL BULL and DR. B. S. HANSON read a paper entitled: "Pathology in its Relation to Diagnosis and Treatment of Cancer in the Cancer Clinic, Adelaide Hospital". This paper was published in the issue of May 20, 1933, at page 609.

DR. E. S. MEYERS read a paper by himself and DR. J. V. DUHIG. He said that for the past five years, he had worked in close cooperation with Dr. Duhig, in regard to the influence of pathology on treatment of cancer of the head and neck. During this time records of some seventy odd patients had been studied. The records had been grouped under the following headings: tongue, lip, pharynx, buccal cavity, jaw, floor of the mouth, ear, parotid, face, tonsil, palate, neck. In the course of his paper Dr. Meyers discussed the relationship of surgical operation and radium therapy in treatment. He indicated the methods adopted by him in the treatment of growths of the tongue, jaw, floor of the mouth *et cetera*, and showed that grading of tumours according to Broder's classification was valuable in determining what type of treatment should be adopted. He described a modification of the operation for removal of glands of the neck as practised by him. He also discussed the factors underlying radiosensitivity. He said that of the 73 patients in his series seventeen, or 23%, had received their initial treatment before coming to the Brisbane Hospital. He was insistent that whatever treatment was instituted, it was the first treatment that offered the greatest hope of cure; it should, therefore, be efficient. To promote this efficiency facilities for cooperation between surgeon, pathologist and physicist should be available. In reference to prophylaxis and early treatment, Dr. Meyers pointed out that many of the patients were old age pensioners. Regular medical and dental inspection of these persons would aid considerably in checking the ravages of oral cancer. Dr. Meyers referred to the need for the establishment in Australia of a registry for cancer. In this registry such matters should be recorded as would allow the efficient correlation of the work of the clinics. In this way it would be possible to formulate the best methods of treatment of the various types of cancer likely to be encountered.

In the second half of the paper Dr. Duhig discussed the pathological aspects of the tumours on which Dr. Meyers had based his remarks. Of these, sixty-eight were squamous cancers and the remainder were miscellaneous growths. He pointed out that cytological grading could give an accurate idea of prognosis. The degree of malignancy of a tumour and the prognosis were definitely modified by the degree of its infiltration and by the extent and nature of the stroma. The anatomical site of the cancer might give a good clinical indication of its grade. Cancer of the floor of the mouth and pharynx was very malignant; cancer of the lip and tongue was relatively of low malignancy and cancer of the cheek and jaw was intermediate between these two. Secondary deposits in the glands of the neck were extremely malignant. Metastasis usually occurred by the lymph stream and later by the blood stream. The grade of a cancer might remain unaltered in metastasis or might change for better or worse. Dr. Duhig suggested that recurrence was often due to latent malignant emboli in the lymphatic vessels of the superficial and deep fasciae. Dr. Duhig claimed to have produced some evidence of the indirect effect of radium by action of the vascular endothelium of capillary and veins.

The paper by Dr. Meyers and Dr. Duhig has been published in full in *The Journal of the Cancer Research Committee of the University of Sydney*, May, 1933.

PROFESSOR D. A. WELSH read a paper entitled: "On the Forms of Classification of Cancer and other New Growths Required in the Certificate of Death, with a Systematic Classification Appended". Professor Welsh said that without undue forcing all new growths might be arranged in seven groups as follows: (i) Epithelial newgrowths, (ii) endothelial newgrowths, (iii) connective tissue newgrowths, (iv) lymphoid and haemopoietic newgrowths, (v) neurogenic newgrowths, (vi) melanotic newgrowths, (vii) embryonic newgrowths (embryoma, teratoma). He then gave a detailed analysis of each group and added special notes where special difficulties arose either in classification or in interpretation. Professor Welsh's paper has been published in full in *The Journal of the Cancer Research Committee of the University of Sydney*, May, 1933.

PROFESSOR P. MACCALLUM considered that the devising of a classification of tumours for the purposes of statistical analysis of the causes of death handled the problem from the wrong end, because such a classification depended upon knowledge which was not static or stable. It was important to insure that insistence on precision in diagnostic certification did not stultify the statistics by fostering specious differential terminology which had little counterpart in fact.

The important point was not so much that a large proportion of cancer cases were inadequately certified, but whether in those in which the information required by the statistician was given by the certifying medical officer, the opinion of the latter was fully justified.

He agreed with Professor Welsh that a microscopic examination of material from every tumour taken before or after death was essential to an accurate conclusion as to the nature of the tumour causing death, and supported the desirability of a separate classification for regional cancer in each organ or tissue primarily involved. Facilities for microscopic examination were frequently available and might be increased.

Although certain medical practitioners never could supply the information required under an ideal classification, it was equally true that some of them (in varying degree) not only could realize the ideal but, to the best of their ability, did so, and were in a position to provide statistics such as Professor Welsh contemplated. The *sine qua non* was competent pathological opinion. It was important to collect such information as was available from those competent to give it.

The value of the statistics and the classificatory detail depended upon the evidence on which the information was based. This in turn depended upon the medical man and the diagnostic means at his disposal. The diagnostic means might be purely clinical. Surgical measures might have been practised and the growth seen and perhaps removed wholly or in part and incised. Biopsy might have led to histological examination. X ray diagnostic methods might have been used or radiotherapy might have rendered aid in diagnosis. Finally an autopsy might have been performed and its value enhanced by microscopy. He considered, therefore, that it should be a simple matter to grade the information according to the diagnostic method applied. He advocated that subdivisions be indicated by abbreviations in brackets after the diagnosis on the death certificate: A. (Clin.) meaning that the diagnostic methods relied on were signs and symptoms only. B. (Rad.) showing that X ray technique had been used in diagnosis. C. (Mac.) indicating that the means used included macroscopic methods, inspection, incision et cetera, whether on the surgically removed specimen or at autopsy. D. (Mic.) signifying that histological methods of diagnosis were applied.

Combinations of these abbreviations might be used where necessary if more than one method were applied, but the order given would probably represent grades of classificatory detail which could usefully be applied for statistical purposes. It would be possible in a similar way to indicate the use of surgery or the performance of autopsy by suitable abbreviations. If autopsy results including histological examination were to be supplied, a suitable time interval would require to be allowed.

While a simple classification would probably prove adequate for the classification of tumours in Grade A, it would defeat the object of the grouping if such restrictions were applied to Grade D. At least two classifications, therefore, would be necessary to deal with the data that would become available: one including the differentiation possible in Grades A, B, and C, and the other wider classification, allowing full scope for the information obtainable from Grade D. It might even be found of value further to grade the classifications, but that was a matter which could probably only be determined by experience.

Such a method of classification, if practicable, would greatly extend the amount of statistical information available and provide internal checks not at present applicable. It would increase its flexibility as an instrument of information, especially, for example, in regard to the possible influence of therapeutic and preventive measures in reducing the death rate in groups obscured by the restrictions of the method of classification at present in use.

He considered that the degree of uniformity obtainable in Australia would depend on the amount of cooperation that could be established between the pathological and statistical groups in the Commonwealth and States, and was of opinion that flexibility should not be sacrificed to uniformity, but that the retention of both was possible within the scope of the plan suggested, granted the necessary cooperation.

Resolution of Conference.

After discussion the Conference reappointed a committee consisting of Professor D. A. Welsh, Dr. F. P. Sandes and Dr. M. J. Holmes to continue the study of the classification of cancer with a view to the adoption of a satisfactory pathological classification.

Diploma in Radiology.

At the Third Conference a review was given of the action which had been taken in pursuance of Resolution No. 6 of the Second Australian Cancer Conference. This resolution was as follows:

This Conference commends to the Commonwealth Department of Health the suggestion that the possibility of the introduction of a Diploma of Medical Radiology and Therapeutics be discussed with the Universities having medical schools through the Faculty of Medicine, and in doing so the Conference urges that the Department of Physics be intimately associated with the introduction of this Diploma.

As previously indicated to the Third Conference, the matter was taken up accordingly with each of the Universities having a medical school, Sydney, Melbourne and Adelaide.

In regard to Sydney, the Committee appointed by the Faculty of Medicine to advise upon the matter recommended the Faculty to advise the Senate of the University in the following terms:

1. That a Diploma in Radiology (Dip.Rad.) be instituted in the University of Sydney and that the complete course for such Diploma extend over one University year of three terms, candidates devoting their full time to the course as follows:

Part 1. One term (230 hours).

Introductory physics.

Special physics dealing particularly with:

- (a) X rays, radium and ultra-violet radiations.
- (b) The design of X ray machinery.

Laboratory practice.

Part 2. Two terms (minimum 500 hours).

- A. Radiography, hospital and clinical practice.
- B. Introductory course to C and D, consisting of normal and pathological cytology and special physiology.
- C. Special pathology of conditions amenable to treatment by radiation.
- D. Radiotherapeutic practice in recognized hospitals, including work at clinics.

2. That courses for the Diploma in Radiology shall only be given when the number of candidates is sufficient to make them self-supporting. (The Faculty estimates the total cost of a course for the Diploma at under £300.)

3. That each candidate for the Diploma in Radiology be required to pay a fee of £50 for the course and £10 for the Diploma.

The committee urged that steps be taken to inaugurate the course for the Diploma in Radiology in 1933, and that, pending the approval of the Senate to the proposal, a sub-committee be appointed by the Faculty to draw up by-laws for the Diploma and otherwise put the scheme into action. The Committee drew up a full syllabus for the course which, as already stated, is intended to occupy a full university year.

Dr. Holmes said that the Acting Vice-Chancellor of the University of Sydney had advised that the Senate of the University of Sydney had decided to establish a Diploma in Radiology at the University upon the lines indicated, and it was expected that the course would be inaugurated in 1933.

At the University of Melbourne the Faculty of Medicine had appointed a committee to consider and report upon the matter of the institution of a Diploma at the University of Melbourne. The Faculty had passed a general resolution in favour of a diploma. The committee appointed by the Faculty had met after a long delay, but no progress was made. A new committee had been formed, and had drawn up a report and a curriculum for diploma courses in X ray diagnosis and radiotherapy. It was understood that this report would be submitted to the Faculty of Medicine shortly and it was expected that the courses would be established.

At the University of Adelaide the matter had been brought up before the Faculty of Medicine, but in the absence of the Vice-Chancellor was deferred pending his return in March of this year.

Public Education.

The third Australian Cancer Conference had passed a resolution that the Commonwealth Department of Health be asked to inaugurate a coordinated educational cancer campaign throughout Australia.

Dr. Holmes said that in accordance with this resolution the following action had been taken:

A series of articles had been prepared and sent to more than a hundred newspapers in Australia, including the provincial Press and weekly newspapers, giving an indication of the present situation regarding cancer, and of the means being taken to control it, and also informing the public of the part to be played by it in taking advantage of facilities provided for diagnosis and treatment. The response of the newspapers had been, on the whole, very good, particularly in the case of the provincial Press.

These articles had been followed up by the distribution of leaflets. The leaflets had been distributed actually to the homes of the people through such agencies as friendly societies, bush nursing and other nursing associations, the Country Women's Association, and the National Council of Women, and Health Department activities such as the child welfare organizations. The friendly societies in particular had cooperated most heartily. The secretaries of the lodges and branches in every part of each State had applied for a sufficient supply of leaflets and had distributed a copy of each in the envelopes with their quarterly accounts. The leaflets, in many cases, had been accompanied by a letter from the board of directors or the secretary of the friendly society concerned urging members to give close attention to the advice given in the leaflets. By these various agencies about 200,000 leaflets had been distributed to the homes of the people and applications were still being received for supplies.

Arrangements had been made with State Branches of the British Medical Association (Queensland excepted) in cooperation with cancer organizations in each State for the giving of broadcast talks on cancer by selected speakers. Lectures had also been arranged.

The Pharmaceutical Society had published an article in the official journal of the Society advising chemists not to treat minor ailments of a nature possibly cancerous, but to recommend inquirers to consult their doctors at once.

A message to the medical profession had been published in THE MEDICAL JOURNAL OF AUSTRALIA asking for cooperation in securing for patients every possible assistance in diagnosis and appropriate treatment, and in the gradual and tactful education of all sections of the community in the early signs of incipient cancer.

Dr. Holmes pointed out that the Commonwealth Department of Health aimed at stimulating interest in various organizations throughout Australia with the object of securing permanency in educational work. It also entered the field of direct education of the public by means of newspaper articles and leaflets. It was not practicable, however, nor was it intended that the Commonwealth Department of Health should continue this work as a permanent function. The Cancer Conference had asked the Commonwealth Department of Health to inaugurate the coordinated educational campaign, and such steps as appeared practicable had been taken to this end. The interest of the various organizations approached was obvious, and there could be no question that the public was eager to obtain information and advice.

In some States a definite organization to carry on education of the public was in existence. A definite permanent organization for this purpose was desirable in all the States. Much of the greatest interest to the public was happening in the field of cancer. Information regarding such matters could readily be put into appropriate form by a suitable committee and made available continuously to the public in various ways.

Dr. Moran in his report had advocated the formation of a permanent body in each State whose function it would be to prepare material suitable for public education and to get this material to the public, not spasmodically but continuously. Such a committee composed of lay members as well as medical members should, wherever practicable, establish such relationships with the newspaper Press that matter for publication in the Press would be previously referred to the committee for advice as to reliability and suitability for publication.

It was considered that there was so much of real interest to the public going on in the field of cancer that, if it were put into suitable form, it would arouse and maintain public interest and cooperation in such a way that financial and other difficulties would lose their acuteness, and the public itself would approach the problems in a sane and purposeful way which would insure their close cooperation in preventive measures, early diagnosis and early treatment.

It was considered that this Conference should draw up a definite scheme for the formation of a permanent organization to provide for the continuous education of the public in matters relating to cancer. It was suggested that this might take the form of a permanent committee in each State, on which there should be representation for the British Medical Association, the State Department of Health, Nursing Federation, and lay organizations such as friendly societies, Country Women's Association *et cetera*. It would be necessary to provide for the central coordination of the work of the several State committees.

The objection that the attempt to educate the public might lead to an unwholesome dread of the disease did not apply if educational methods were carefully selected and controlled.

At the beginning of the campaign inaugurated by the Commonwealth Department of Health, the Press in Sydney had reported the suicide of a woman who was listening to a broadcast talk on cancer. In the midst of the talk she went out of the room and took poison. In this case, the broadcast talk was being given by a non-medical person who drew a gloomy picture of the chances of a cancer patient in the hands of the medical profession as a contrast to the sure and certain hope of a glorious recovery which he had to offer. The woman, unfortunately, had not waited to hear the good news. Cancer propaganda could certainly be most harmful, but public education in suitable hands should do nothing but good.

Dr. W. P. HOLMAN reviewed the action taken in Tasmania. This has already been mentioned in the summary of Dr. Holmes's opening remarks.

Dr. E. H. MOLESWORTH referred to the recommendations made to the previous Conference on the prevention of cancer of the skin and of the buccal cavity.

The Conference also had before it a report to the Commonwealth Government by Dr. H. M. Moran compiled after his visits to cancer centres in England, France, Germany, Sweden and Belgium. One of the recommendations in Dr. Moran's report was that an anti-cancer education league, on the lines of the Mount Vernon body, should be formed with its headquarters at Canberra and with branches in every State.

After discussion it was resolved that a committee of six (Dr. H. M. Moran, Dr. E. S. Meyers, Dr. W. G. Cuscaden, Dr. F. S. Hone, Dr. E. Atkinson, Dr. W. P. Holman) should be appointed to consult with existing organizations with the object of drafting a scheme of federal organization which, if sufficient progress had been made, should be circulated at the time of notification of the date of the next Conference.

Resolution of Conference.

It was also resolved:

That this Conference is impressed by the influence of skin irritation by sunburn as a potent factor in the production of pre-cancerous conditions and actual cancer in exposed parts of the surface of the body, and considers that a warning should be given by Health Departments and other authorities to the public to keep constantly in mind the necessity of taking reasonable steps to avoid unnecessary sunburn. This applies to exposures during both recreation and out-door work, especially in the drier districts of the interior.

Mild Radium Therapy.

Dr. Holmes pointed out that from time to time importers made application to the Trade and Customs Department for permission to import for sale within Australia materials and apparatus which contained or were said to contain radium. He enumerated several forms of such apparatus.

Discussion centred round the possible therapeutic value of mild radium therapy and also round the possibility of harm arising from prolonged application of radium by means of pads, solutions for drinking, pills *et cetera*. Reference was made to the opinion expressed by Lord Lee, Chairman of the National Radium Commission in England, who had strongly deprecated the commercial exploitation of radium.

Resolution of Conference.

It was resolved:

That this Conference is of the opinion that the admission into this country of apparatus and preparations for use in so-called mild radium therapy would be inimical to the treatment of cancer and to the health of the community.

Protection Measures.

At the Second Australian Cancer Conference the question of the protection of workers and patients from damage arising from unnecessary exposure to radium and X rays was fully considered.

A special committee was appointed by the Conference to deal with this matter. This committee made a report to the Conference which included a number of recommendations which were adopted as resolutions of the Conference. These resolutions appear in the Report of the Second Cancer Conference.

Dr. Holmes said that action had been taken by the Protection Committee and by the Commonwealth Department of Health and by institutions concerned in these resolutions.

The various institutions using radium had taken action to comply with the international recommendations in regard to storage and handling of radium, and generally speaking, adequate facilities for protection of staffs were

provided. Blood examinations were carried out on members of staffs at intervals not exceeding three months and in some cases every month. In the case of some institutions a basal metabolism test was also made at intervals.

As already indicated, a committee in Melbourne, working under the guidance of the chairman of the Protection Committee, Professor Laby, had prepared a valuable series of recommendations regarding precautions against loss of radium and covering the storage and handling of radium. This had been published by the Commonwealth Department of Health for the guidance of institutions holding radium.

As indicated to the last Conference, arrangements had been made at the Commonwealth Radium Laboratory, Melbourne, to carry out the measurement of the exposure to which individual workers were subjected in their daily work. This was done by means of the exposure of standard photographic films in suitable containers on the persons of the workers themselves, and in various situations in the buildings in which the work was carried on. This investigation was in charge of Mr. Turner, Physicist in charge of the Commonwealth Radium Laboratory. It would be remembered that Mr. Turner reported progress at the last Conference and his paper was published in the report of the Conference.

In regard to warning notices, the Protection Committee had prepared a warning notice regarding risks and precautions for use in hospitals and elsewhere where radium was employed. Members of this Conference had the notice before them. If the Conference adopted it, it would be printed by the Commonwealth Department of Health on wall cards (some two feet by eighteen inches) and distributed to institutions concerned. The warning notice covered risk in connexion with radium, X rays and electric shock.

It is considered that this warning notice which, being intended as a wall sheet was necessarily concise, should be accompanied by a leaflet containing additional information, and this leaflet might as occasion arose be followed by additional leaflets containing information of importance in connexion with protection of staffs.

The Conference had before it the "Draft Australian Standard Rules for the Design, Installation and Operation of X Ray Equipment", drawn up by the Standards Association of Australia.

PROFESSOR T. H. LABY reviewed the work of the Protection Committee and discussed the draft X ray code of the Standards Association.

MR. A. H. TURNER discussed the measurement of exposure to stray radiations.

Resolution of Conference.

The Conference added the names of Dr. E. H. Molesworth and Dr. Robert Fowler to the committee formed under Resolution 4 of the Third Australian Cancer Conference and referred to this committee the Draft X Ray Code of the Standards Association of Australia and also the warning notice for further consideration and report.

Screenage.

In introducing the subject of screenage Dr. Holmes said that experience had indicated that radium for use in the treatment of cancer of certain regions would be more effective if it were more heavily screened. The Third Cancer Conference had given consideration to this matter and had appointed a committee consisting of Mr. Turner, Dr. Sandes, Dr. McKillop, Dr. Cuscaden and Dr. McCoy to investigate and report on the matter of increasing the screenage of radium and radon containers. This committee had worked during the year and had produced a report.

The report of the committee was as follows:

The members of the Committee have discussed by correspondence the matters referred to them, and report as follows:

1. That for the effective radium treatment of certain types of malignancy and especially for the effective treatment of lesions in certain sites the

screenage afforded by the Commonwealth radium on loan to the various centres is insufficient.

2. That the following types of cases are suitable for radium and radon treatment with screenages greater than 0.5 millimetre of platinum:

- (a) Carcinoma of the uterine cervix.
- (b) Cases where the radium or radon must be placed in close proximity to bone or cartilage or to important nerve trunks.
- (c) Malignant lesions in the bowel.

3. That for gynaecological work the screenage of the radium tubes should be increased as follows:

- (a) 5 milligramme tubes increased from 0.5 millimetre of platinum to 1.0 millimetre of platinum.
- (b) 10 milligramme to 50 milligramme tubes increased from 1.0 millimetre of platinum to 2.0 millimetres of platinum.

If radon is used in such cases the screenage should be as recommended for the radium.

4. That for treatment in the other sites indicated above where radium needles are to be employed the screenage of the needles should be increased from 0.5 millimetre of platinum to 0.8 millimetre of platinum. If radon needles are employed the screenage should be 0.8 millimetre of platinum.

5. That in spite of the fact that radon may be employed for the types of case demanding heavier screenage at present at the major treatment centres in Australia, it is recommended that the screenage of a certain number of the Commonwealth radium tubes and needles should be increased to the values given above.

6. That coordinated research by laboratory and clinical workers into an investigation of the effectiveness of various screenages of radium and radon in the treatment of various types of case is to be encouraged and should provide data for the more efficient clinical use of these agents.

7. It is recommended that the question of screenage of radium and radon be the subject of detailed discussion at the next Australian Cancer Conference.

Dr. Holmes said that information had also been collected from hospitals regarding their requirements in respect of additional amounts of radium, and in respect of any radium held in a form which did not lend itself to efficient use. The requirements of gynaecologists in particular for increased quantities of radium with heavier screenage had been investigated.

It had been found:

(1) That a number of hospitals were desirous of obtaining more radium. This applied particularly to the Coast Hospital, Sydney at which a clinic had recently been formed.

(2) That a certain amount of the radium held would be the better for additional screenage. This was indicated in the report of the Screenage Committee.

(3) That monel metal needles were often not in use because of insufficient screenage.

(4) That a greater proportion of longer needles were required.

Items 3 and 4 had been met in many instances by placing the monel needles in brass tubes and using them for distance treatment in packs, and by soldering short needles together to provide the longer needles required.

Items 1 and 2 required consideration by the Conference in the light of the following facts:

When the Commonwealth radium was distributed in 1928, a quantity of 720 milligrammes had been allocated to the Sydney University Cancer Research Committee, and 980 milligrammes to the Melbourne Hospital for use in mass treatment. Both these hospitals now considered that this radium could be more efficiently used in another way.

The 720 milligrammes held by the Sydney University Cancer Research Committee was in the form of 20 milligramme tubes screened with monel metal. It had been suggested that the screenage might be increased and the

tube used for the treatment of gynaecological cancer. This increased screenage could be carried out at small expense if no objection was raised to increasing the size of the tubes. If smaller tubes were required the necessary handling of the radium itself would involve considerable difficulty and expense.

As regards the 980 milligrammes used for mass treatment at the Melbourne Hospital, it had been suggested by the hospital that it could be more efficiently used in the production of radon, larger supplies of which were demanded in Melbourne. In this connexion it should be remembered that radon could be issued in containers of any desired length and any desired screenage to suit any particular case. It provided a very flexible agent in treatment.

As against this proposition was the fact that a quantity of radium bromide which was offered to the Universities of Western Australia and Queensland for use in production of radon at those centres was available for use elsewhere because neither Perth nor Brisbane had provided a plant for the production of radon.

The radon in the 980 milligramme "bomb" at the Melbourne Hospital was in four containers, each holding about one-quarter of the total amount, and the radium was in the form of sulphate. It would be a most difficult and expensive matter to divide this radium into small quantities and to screen it with platinum in order to supply the demand for more radium for buried techniques.

On the other hand the Commonwealth did not possess reserve stocks of radium for such a purpose. The only radium held in reserve that was not already allocated to treatment centres was: (i) a very small reserve for replacement of radium lost by the institutions holding it; (ii) the standard research tubes which were required for standardization purposes, and which as a matter of fact were not idle as they were issued from time to time for special treatment or research work; (iii) the radium bromide which was offered to Brisbane and Perth and which was available for increased radon production. This set out the position briefly.

As regards arguments for or against the establishment of a radium bomb in Australia, it was suggested that a discussion on this matter would best be deferred until after X ray therapy had been considered, and provision had been made on the agenda accordingly.

In regard to research, Dr. Holmes said that coordinated research as recommended in paragraph 6 of the Report of the Screenage Committee was being undertaken in Melbourne under the direction of the Cancer Research Committee of the University of Melbourne. A special sum of money was allocated for this purpose.

DR. H. M. MORAN stated that expense should not stand in the way of putting the radium to its most efficient use. The Commonwealth Government, which owned the radium, should bear the cost of splitting up the 720 milligrammes available at Sydney. He considered that the 20 milligramme tubes with increased screenage were too bulky and suggested tubes of smaller diameter in sizes 10 milligramme and 5 milligramme (more tens than fives). This would be specially suitable for gynaecological use, and additional radium for use in gynaecological cancer was urgently required, as patients had to wait for long periods for their turn in treatment.

DR. F. A. MAGUIRE supported Dr. Moran regarding making this radium available for gynaecological use, but urged that the radium be put up in 25 milligramme platinum tubes.

DR. F. P. SANDES said that there were many claims for gynaecological radium, but he suggested that of the 720 milligrammes under consideration, 500 milligrammes be for gynaecological purposes, and 220 milligrammes for distribution as recommended by the Sydney University Cancer Research Committee.

DR. H. G. CHAPMAN advocated that if the radium were reconditioned care should be taken that the amount of radium in the tube should be the accurate equivalent of 10 milligrammes or 5 milligrammes of radium element as the case might be.

DR. H. H. SCHLINK considered that screenage should be altered only when evidence as to its necessity was definite. He deprecated changing about. The increase of the screenage of a certain proportion of containers as advocated by the Screenage Committee might be carried out now, but no further alteration should be undertaken for at least ten years.

DR. ROBERT FOWLER thought that a somewhat greater screenage than that at present in use would be of value, but that the degree of extra screenage required was small. He favoured 10 milligramme tubes screened with platinum for gynaecological use. DR. Harker thought that little more than 1 millimetre of platinum should be sufficient.

PROFESSOR T. H. LABY asked for consideration of the use of gold in preference to platinum for economic reasons. The Conference considered, however, that gold was too soft and that platinum was preferable.

Several delegates including DR. C. READ, Royal North Shore Hospital, Sydney, DR. H. M. MORAN on behalf of the Coast Hospital, Sydney, DR. H. K. PORTER, Sydney Hospital, and DR. J. O'SULLIVAN, Saint Vincent's Hospital, Melbourne, indicated the desire of their institutions for an allocation of radium or for an increase of the quantity of radium at present held on loan by them, and asked for consideration of their requirements should radium become available.

At this stage DR. F. P. SANDES read a paper in which he propounded a theory of the atom with special reference to the radon atom.

Resolution of Conference.

It was resolved:

(1) That the Conference commends to the Commonwealth Government the subdivision in the most efficient way for the treatment of cancer of the 720 milligrammes of radium now held at the Sydney University for mass treatment purposes.

It is thought that the claims for increased quantities for gynaecological use should be specially considered.

The Conference recognizes that considerable expense will be involved, but considers that the circumstances in respect of cancer treatment require that the radium possessed by the Commonwealth Government should be in that form in which it is adapted for the most efficient and most widespread use.

It is considered that, of the 720 milligrammes referred to, 500 milligrammes should be utilized for gynaecological purposes and 220 milligrammes utilized as recommended by the Cancer Research Committee, University of Sydney.

(2) The Conference adopts the Report of the Committee on the screenage of radium.

As regards the radium held by the various treatment centres and which under the recommendation of the Screenage Committee should be more heavily screened, it is recommended that each treatment centre prepare a statement for the Commonwealth Department of Health of any such radium held by it and of the degree of screenage required, in order that consideration may be given to the practicability of providing funds for the purpose of carrying out the necessary work.

Regarding the radium available for radon production it was resolved:

That this Conference recommends that the Commonwealth Department of Health, after making full inquiry, should place any radium available for radon production at those places where it is most required.

X Ray Therapy.

At the Third Cancer Conference the question of X ray therapy was discussed at some length and the practical steps to be taken to provide for determination of the quality of X rays produced by any given apparatus and the measurement of the dose of therapeutic rays actually

received by the patient were considered. In order to obtain as great a degree of accuracy as possible in the use of X rays, and to provide for coordination in connexion with techniques, and uniformity in the recording techniques employed and the results obtained from treatment, the Conference made a series of recommendations embodied in Resolution 4 of the Conference. DR. HOLMES said that action had been taken on these recommendations.

In the case sheets printed by the Commonwealth Department of Health and used by the treatment centres, provision was made for uniform recording. The Commonwealth Department of Health had also provided special forms for recording ultimate results of treatment, and this year a few of the treatment centres had sent in returns of patients treated and of the results obtained. This information had been consolidated and was available. It was expected that next year a large mass of information would be submitted by treatment centres for consolidation and analysis.

DR. EDDY in his paper to the Third Conference on X ray output had suggested that a standard instrument for calibrating dosage meters should be set up in Australia, and also that provision should be made for calibrating kilovolt meters. This suggestion had been adopted by the Conference which asked the Commonwealth Department of Health to set up the standards. The Commonwealth Department of Health had obtained the approval of the Commonwealth Government which provided the necessary funds. A standard ionization chamber had been set up at the Physics Department of the University of Melbourne for calibrating dosage meters and a standard for calibrating kilovolt meters had also been provided.

In order to provide for necessary further consideration of the details by the Conference in relation to recording of dosage in international "r" units, the determination of the quality of X rays emitted from any given apparatus and the accurate recording of the type of machinery and techniques employed, the Conference appointed a sub-committee. This subcommittee had done its work and submitted a report for the Conference.

The report was as follows:

Subparagraph (c).

1. It is recommended that the international unit of X ray dosage, the Röntgen, should be universally adopted in specifying the dose given to patients undergoing X ray treatment.

2. Instruments for measuring the dose of X rays given to the patient in terms of the Röntgen unit should be regularly used with all X ray apparatus employed in treatment.

3. All such dose recording instruments should be calibrated in terms of Röntgen units by comparison with a standard ionization chamber, and that such calibration should be repeated at intervals of not greater than six months.

4. That instructions should be drawn up by this subcommittee and issued to users of X ray therapy equipment stating the procedure to be adopted in the use of the dosage measuring instruments.

5. It is recommended that the ionization chamber after standardization be placed on the skin of the patient when the dose in international Röntgen units is being evaluated.

Sub-paragraph (d).

1. It is recommended that the specification of the quality of X radiation in terms of the half value layer of copper or of some other filter be abandoned, as it is now believed that the information obtained by such specification is of little value.

2. The Committee is of the opinion that of the methods of estimating quality that employing the X ray spectrometer is the one most likely to yield reliable information.

3. That investigations be carried out in Sydney and in Melbourne to determine the most satisfactory way of interpreting the spectrographic record.

Sub-paragraph (e).

It is recommended that the following information be asked for from those using X ray therapy concerning their X ray machines:

Date of purchase; maker; rectification (mechanical or valve; if mechanical, disk or arm; if valve, what circuit employed).

Type of X ray tube: maker; rating.

Technique: kilovoltage; focal skin distance; milliampere; filter; port of entry.

The Present Position of Deep X Ray Therapy.

Dr. A. T. NISBET read a paper on the present position of deep X ray therapy.

He took the Commonwealth index of classification of diseases treated in radiotherapeutic centres and commented on each item in the classification (62 in all) in relation to its reaction to deep X ray therapy. Certain criticism of this index of classification was made, particularly as regards the sarcomata and the diseases of the blood.

Statistics taken from Royal Prince Alfred and Saint Vincent's Hospitals and from his own work were quoted, and the percentage of patients apparently cured over three to four years was given in most cases.

Particularly was the benefit of modern technique in irradiation stressed in carcinoma of the prostate, rectum, breast, parotid, thyroid and uterus.

The results of surgery of cancer of the breast were criticized and a plea was put forward for further research into treatment by radiation. Also Dr. Nisbet considered that even if operation were subsequently performed, X ray treatment should always be given beforehand. Chronic mastitis was discussed and the results of X ray therapy were shown to be excellent.

The idea that treatment of a chronically inflamed breast disturbed future lactation was disproved by a series of young women who had breast-fed their babies normally after a full course of X ray therapy. In carcinoma of the thyroid, out of nineteen patients regarded as "cured", ten had remained well over a period of two years.

It was pointed out that it was hardly likely that these ten patients would show ultimate cure, but the decided relief of symptoms and the diminution in size of the tumour showed that X ray therapy was something for which this type of patient was decidedly grateful.

The malignant prostate, just, or just not, operable, should, it was thought, be now sent for treatment to the radiologist rather than to the surgeon.

Carcinoma of the rectum was discussed at length and figures were quoted to show the improvement which had taken place in dealing with this disease.

Dr. Nisbet concluded by stressing the necessity for accurate knowledge of the voltage used with deep X ray apparatus, and also the importance of using at least 200 kilovolts and a high filtration of copper.

Measurements of X Rays.

Dr. C. E. Eddy read a paper on recent developments in the measurements of X rays. He said that it was generally recognized that, in the development of a satisfactory technique of X ray therapy, both the intensity and the quality of the X ray beam should be known in sufficiently definite a manner that workers in other laboratories could have no difficulty in producing a beam of similar intensity and quality. Further, it was well known that neither the total intensity nor the distribution of intensity amongst the various wave lengths could be predicted with any degree of certainty from measurements of the voltage and current at which the tube was operated.

During the past few years a considerable amount of attention had been directed towards the perfection of methods of measuring X ray intensity and quality, and, in addition, careful investigations had been made of the variations in the X ray output of a tube excited by different types of generators.

Turning to the international comparison of the "r" unit, Dr. Eddy said that with the adoption of the international "r" unit, it was left to the physicists of the national laboratories to construct standard ionization chambers

with which the unit could be realized. Although the same basic principles had been adhered to, there had been such individuality of design and construction that no two were exactly alike, and on account of these differences it was very important to discover how closely the several standards agreed.

A small ionization chamber developed by the United States Bureau of Standards had recently been compared with the standards of Great Britain, Germany, France, and the United States. (The design of this ionization chamber had been adopted by the Commonwealth Radium Laboratory in the construction of the Australian standard ionization chamber.) A summary of the results of the comparisons is given in the following table.

TABLE II.
International Comparison of the "r" Unit.

Laboratory.	Tube Voltage, Kilovolts.	Half Value Layer, Millimetres of Copper.	Ratio of Unit to Portable Unit.
United States ...	100-170	0·10-1·10	1·0005
Great Britain ...	110-140	0·11-0·50	1·0005
Germany	100-180	0·16-1·10	1·0035
France	110	0·25	2·10
(Solomon unit) ...	150	0·75	2·28
	190	1·00	2·29
	190	1·50	2·30

Dr. Eddy pointed out that the agreement between the national standards was as close as might be reasonably expected and was much better than was at present required for practical calibration purposes. The variation in the value of the Solomon unit with differences in the quality of the radiation emphasized the necessity for a "free air" standard as opposed to the "thimble" type of chamber.

As a result of the experience gained during these comparisons, the National Laboratories had issued recommendations which should be observed when carrying out comparisons of ionization chambers.

In regard to the comparison of the output of X ray generators Dr. Eddy said that it had long been known that the X ray output, both in quality and intensity, from two high tension units, even when operating at the same peak voltage and tube current, might differ to such an extent that it had been practically impossible for therapists to reproduce with exactness the techniques developed by workers using different machines.

Results of some careful investigations into the output of X ray generators, which had been carried out at the United States Bureau of Standards with the cooperation of the American Radiological Research Institute and the manufacturers of X ray apparatus, indicated that it would now be possible to compare the outputs of different machines much more readily. It had been found that, if the effective or root mean square voltage (as given by some type of electrostatic kilovoltmeter) were measured instead of the peak voltage (as given by the sphere gap), and if the effective current was measured with an alternating current milliammeter (instead of the average current as given by a direct current meter), then the X ray outputs of different types of mechanically and valve rectified plants were equivalent both in intensity and in quality for equal applied voltages and tube currents. The specification of the effective voltage and effective current would, therefore, make it possible for a much more exact reproduction of techniques found satisfactory in other treatment centres, since if two X ray beams were of the same quality, then they would produce approximately equal depth doses.

Discussing the advantages of some form of electrostatic kilovoltmeter Dr. Eddy said that the measurement of the effective applied voltage would necessitate the use of some form of continuously reading voltmeter in the secondary circuit. This might take the form of an electrostatic voltmeter, or a moving coil or moving iron voltmeter, in series with a very high non-inductive resistance, or it might be the simpler and less expensive electrostatic kilovoltmeter. The presence of such an instrument in the high tension circuit would enable readings of the applied voltage to be obtained throughout a treatment, and this

would prove a great advantage over the sphere gap method, by which a reading of the peak voltage was obtained only at the beginning of a treatment. An electrostatic kilovoltmeter would further prove of value in adjusting the positions of the rotating arms of a mechanically rectified unit with ease and accuracy.

In regard to the measurement of X ray quality, although the only accurate method of determining the quality of an X ray beam was by the direct measurement of the spectral energy distribution by means of the crystal spectrometer, it had been considered that this method was so cumbersome and difficult that other methods of estimating quality from absorption measurements had been devised. These methods were not free from the criticism that measurements of intensity were of peculiar difficulty, and that the alteration of quality consequent upon the passage through absorbers could produce considerable errors in intensity measurements. This was particularly the case when a thimble type of ionization chamber was used, since then the longer wave lengths were more effective. The results of Taylor indicated that absorption methods of measuring quality were unsatisfactory in that two X ray beams of quite different wave length range could still be said to have the same quality. In view of this, it was possibly of importance that the objections to the spectrographic method should be examined more carefully in the future.

When it was remembered that it was actually a comparison of the intensity distribution with wave length of the X ray output of different machines, and not an absolute determination that was required, many of the objections to the photographic method of measuring intensity disappeared. The photographic method of comparing intensities had been used successfully in the Commonwealth laboratory for radiation varying from the hard γ rays to X rays of more than four Angström units, and it did not seem improbable that a satisfactory specification of quality could be given from spectrographic photographs.

Photometric Determination of X Ray Quality.

DR. W. H. LOVE read a paper on the photometric determination of X ray quality. He pointed out that in order to specify adequately the quality of a heterogeneous beam of X radiation, it was necessary to evaluate the relative amounts of energy associated with each particular narrow range of wave lengths. A general survey of the principles involved in the photometric technique was made and particular attention was given to a consideration of: (i) photographing the X ray spectra; (ii) the evaluation of the photographic density associated with the various wave lengths; (iii) the relation between film density and intensity of radiation; (iv) variation in coefficients of absorption of the different wave lengths in the photographic emulsion; (v) the overlapping of spectra in different orders; (vi) the coefficient of reflection of the crystal in the X ray spectrometer; (vii) the final elimination of small errors.

Saturation Techniques.

DR. J. G. STEPHENS read a paper entitled: "The Time Factor in Radiation Therapy with Special Reference to the Saturation Technique".

He said that as he surveyed the horizons of radiation therapy at present there appeared to be three main lines along which advance must come: (a) Determination of the optimum rate of applying the dose and of the best time distribution of the dose. (b) Determination of the optimum quality of radiation and whether or not there was any specific wave length effect. (c) Discovery of adjuvants by means of which the radiosensitivity of pathological tissues might be augmented.

Careful attention to the time distribution of the dose alone afforded marked advantages and had sufficed to extricate radiation therapy from the hopeless position which it had previously occupied in refractory types of newgrowth, such as those of the tonsil, pharynx and larynx. Dr. Stephens pointed out that there were in the main four possible techniques by which X radiation could be applied to a newgrowth: (a) A single massive dose or two or three large doses given over a period of one or two days. (b) Small fractionated equal doses

delivered on alternate days over a period of two or three weeks. (c) Full initial dosage delivered in a short period of time (about one week) followed by further small supplementary or saturating doses at successive intervals so as to maintain the full reaction originally produced (saturation technique). (d) Small daily doses delivered over a period of about one month, each dose being itself protracted and delivered slowly over a period of one or two hours (protracted fractional technique).

When the clinical effects of these methods were compared the marked advantage of saturation and protracted-fractional technique became apparent. Photographs of patients were shown and instances of actual treatments were cited. Countless variations of the preceding four methods were possible and cases were cited in which even small daily doses over a period of three or four weeks without the expensive protraction of each dose (fractionation without protraction) had shown advantages over the simple plan of tri-weekly treatments and certainly over the massive dose plan which nowadays had almost everywhere been drowned in a chorus of protests. Protraction of each individual dose brought added advantages and less damage to normal tissues. Just as with radium most of the failures occurred with quick time techniques, so with X rays the spreading out of the dose in time was immensely important. Radiation effects were a function of the time in which the dose was given.

In the saturation method it was assumed that radiational damage to cells subsided at the rate of about 6% or 7% per day. This was a pure assumption based upon observations of the decay of the skin erythema. Granting the greater vulnerability of neoplastic cells and possibly also their slower recovery rate, it was shown how by means of fairly large initial doses followed at calculated intervals by further saturating doses a wide divergence between the damage to the newgrowth cells and normal cells could be reached. The calculations were made from an exponential curve based on a 6% daily decay rate.

By means of the protracted fractional technique Coutard had secured 28% of five year cures in cancer of the larynx, using X rays at 180 kilovolts only. Although the last word had not yet been spoken, it did appear as though proper time distribution of the dose were more important than the use of extremely high kilovoltages. Moreover, many of the advantages attached to the use of very highly filtered radiation (two and three millimetres of copper) were due not so much to the hardening of the rays as to the fact that the time taken to deliver a dose and the time taken to secure a skin effect were prolonged so that the protracted fractional techniques were approximated to and larger total doses tolerated. Identical arguments could be applied only in identical circumstances and it was idle to compare a dose of radiation of one quality delivered in a certain time with the same dose of another quality unless delivered in the same time. Moreover, of course, the same number of " r " units registered in the same time by two beams of different quality did not represent two beams conveying equal energy in a given time.

The Coutard protracted-fractional method enabled doses of 5,600 r and upward to be applied to each skin field. Thus the total dose at the site of the lesion was of the same order with X rays as with their complement, radium, even when this was implanted in the growth.

Resolution of Conference.

It was resolved:

That the Report of the Committee appointed under Resolution 4 of the Third Australian Cancer Conference, 1932, regarding: (c) That dosage should be recorded in international " r " units. (d) That the quality of the radiation shall be specified, if possible, in terms of the half-absorption layer of copper. (e) That the type of machinery and the technique employed shall be recorded and especially whether constant potential or mechanically rectified. The records shall include also the peak voltage, the tube, the target, the target skin distance, the filtration, the size of the field, the ports of entry and the time of exposure—should be adopted and that the Com-

mittee be requested to inquire further into developments in respect of high voltage X ray therapy plants and that Dr. E. H. Molesworth and Dr. Robert Fowler be added to the Committee.

It was also resolved:

That this Conference recommends for consideration of any treatment centre able to raise the necessary funds, the installation, when procurable, of a high voltage X ray equipment for experimental treatment purposes.

A Radium Bomb.

A discussion too place on the question of mass treatment by a radium bomb. Opinions were divided as to the advisability of making an effort to secure a radium bomb for Australia.

It was resolved:

That this Conference recommends the Commonwealth Department of Health to make inquiries of the Radium Belge as to the possibility of hiring a radium bomb.

Cancer of the Female Pelvis.

Dr. Holmes, as he had done at the Fourth Conference, referred to the fact that the Radiological Sub-Commission of the Cancer Commission of the Health Organization of the League of Nations, was endeavouring to ascertain what methods of radiological treatment gave the best results in cancer of the cervix uteri, and was doing this by a cooperative system of research. The help of gynaecologists in various countries had been solicited.

A number of gynaecologists in Sydney, Melbourne and Perth were cooperating in this international investigation. The investigation was being carried out according to the rules laid down by the Radiological Sub-Commission, and full particulars were being recorded on the International Form adopted for the purpose. The patients were to be followed up for a period of years and history subsequent to treatment was fully recorded. An interval of at least three years would be allowed after treatment before results were assessed by the Radiological Sub-Commission, but arrangements had been made for an interim report of the gynaecologists concerned to the Commonwealth Department of Health including a return of the patients recorded on the International Form.

Papers were read on various aspects of cancer of the female pelvis by Dr. Leila Keatinge and Dr. Constance D'Arcy, by Dr. H. H. Schlink and Dr. Clement Chapman, by Dr. H. M. Moran, Dr. F. A. Maguire, Dr. Robert Fowler, Dr. J. E. Blewett and by Dr. L. S. Kidd. Some of these papers have been published in this journal and the remainder will be published in the near future.

Arrangements for Future Conferences.

Dr. E. S. Meyers on behalf of the Queensland Cancer Trust moved that the place of meetings of the Cancer Conference be alternatively at each capital city. Dr. Kaye Scott seconded this motion on behalf of the Melbourne Hospital. The matter was then freely discussed and the decided advantages associated with meeting in Canberra were stressed by a number of delegates. Dr. Meyers's motion was then put and was lost by 2 votes to 61.

The Conference then discussed a number of suggestions made by members relating to the organization and procedure of the Conferences:

(1) That the date of the Conference be fixed six months ahead.

(2) That a small committee be appointed to consult with the Commonwealth Department of Health in order to arrange the business of the Conference three months in advance and to consider regarding papers to be invited for the Conference.

(3) That information regarding the agenda paper be published in THE MEDICAL JOURNAL OF AUSTRALIA two months in advance of the Conference.

(4) That all papers be delivered to the Commonwealth Department of Health three weeks before the Conference and be circulated together with abstracts prepared by

the authors. It was recognized that this course, though desirable, presented considerable practical difficulties.

(5) That the proceedings of the Conference should include an abstract of the papers prepared by each delegate who had read a paper.

(6) That in the absence of authors from the Conference, their papers should be circulated but not read at the Conference, except by special resolution of the Conference.

(7) That papers be read by their authors rather than that an abstract be read by others.

(8) It was suggested that papers be regarded as being within these categories: (a) those of general interest; (b) those of medical interest; (c) those of interest to physicians; and that meetings of these three sections be held simultaneously in order to save time.

Dr. Leila Keatinge pointed out that the work of each section was of the greatest interest to the others. The work of the physicians, for example, was of the highest importance to the therapists, and the physicians got their lines of research indicated by free discussion with the therapists. This exchange of experiences was one of the chief objects of the Conference. She was of the opinion that there should be no splitting up of the Conference into sections. The Conference agreed with this view.

Obituary.

ROBERT HUMPHREY MARTEN.

The following appreciation of the late Dr. Robert Humphrey Marten has been forwarded by Dr. A. A. Lendon.

Of the early days of Dr. Robert Humphrey Marten I have but little to record. He was born on August 3, 1860, at Penn Hall, near Wolverhampton, the residence of his father, a civil engineer. In very early childhood he lost his mother; his father married again, and soon left a widow in anything but affluent circumstances.

The lad was educated at Wolverhampton Grammar School, and then sent as a boarder to Mill Hill School near London. From school Marten, having decided to take up medicine as a profession, proceeded to University College, London. There is no tangible evidence of any great distinction in the shape of prizes or medals obtained either at school or college, but I am convinced that he must have been a bright and intelligent pupil. He took the M.R.C.S. in 1883, and then obtained a house surgeonship at his hospital under Mr. Christopher Heath (sometime P.R.C.S.), the medical superintendent of the time being one Victor Horsley; in the following year he obtained the L.R.C.P. diploma.

It was during this period (1884), or just at its conclusion, that a singular offer was made to him. He was invited to take charge of a patient, with the promise of "a bag of gold" as a reward for delivering him alive at Adelaide. I need hardly say that the patient's illness was of a mental nature, and for certain legal reasons it was desirable that he should end his days in Australia rather than on English soil. For similar obscure reasons it was essential that he should be landed here alive, so that amongst other precautions it was ascertained that the porthole of the cabin occupied by Dr. Marten and his companion was less in diameter than the width of the latter's shoulders. Dr. Marten was also supplied with a hammer to keep under his pillow in case his stable companion should prove obstreperous.

The voyage was uneventful as far as the two travellers were concerned, and Mr. X was handed over to his friends or their representative on arrival. This delivery effected, Dr. Marten was leaning over the ship's rail when he was hailed by a personage well known at the Semaphore in those days as the "Sandhills Savage"—Mr. R. Jagoe, a hirsute individual who acted as quarantine official. "Are you Dr. Marten?" "Yes." "Come down here, I have something for you." It was the bag of gold. Dr. Marten never divulged the value of the contents nor the name of his patient.

He continued his passage in the steamer to Sydney and, strolling up from Circular Quay along Macquarie Street,

he was attracted by a notice outside the Sydney Hospital intimating that a house surgeon was wanted. He went into the office and promptly secured the appointment; he held it, however, but for a very short period—a matter of a few weeks—and then returned to England, determined to do post-graduate work. The bag of gold was doubtless a factor in arriving at this decision, for the cost of his medical education was a debt to the parental estate which took a long time to liquidate.

He went up to Cambridge, and early in 1888 became M.B. and B.Ch., meanwhile attracting the special notice of Professor Humphry, the famous anatomist and surgeon of that date.

No sooner had he graduated than his opportunity came once more and he was prepared to seize it at once.

Between the years 1877 and 1888 there flourished in Adelaide a German doctor, Oscar Görger. Adelaide has always had a considerable Teutonic colony in its midst, with their *Town Vereins* and clubs, and even at one time their own hospital: for the most part very worthy colonists. Musically inclined, they met to sing "*Die Wacht am Rhein*" or "*Deutschland über Alles*" and to chant sweet guttural hymns at the cemetery over the graves of their departed.

By 1883 Dr. Görger had become one of the leading practitioners of the city as well as an honorary surgeon to the Adelaide Hospital. He had an imposing physique, and his face bore the proud scars of many a duel at Heidelberg University; in dress he affected a rather curious frock coat, buttoned up almost to the collar stud. He was an able practitioner, and successful, but these facts did not recommend him particularly to his rivals in practice, and they succeeded in replacing him on the staff of the Adelaide Hospital by Dr. E. C. Stirling. I can see now the carriage and pair in which Dr. Görger used to be driven at a furious rate along North Terrace by his coachman, Karl Hunderfund, who had formerly been a driver in the Prussian Horse Artillery. Seated on the middle of the box, holding the reins in both outstretched hands, this son of Nimshi could easily have given points to our fire brigade reel. Both master and man had served in the war of 1870-1871.

Dr. Görger made a small fortune and speculated in land. The slump duly arrived and Dr. Görger met his creditors. He retired from his private residence at Menindie. The equipage was reduced to a buggy with one horse, and the doctor now lived in a small cottage on North Terrace, conveniently situated with regard to his consulting rooms over the chemist's shop of Berthold Grummet in Rundle Street, near Gawler Place. He had built on South Terrace a very substantial, commodious and well equipped private hospital.

Fortune smiled once more on Dr. Görger when the Broken Hill mines started, and he decided to return to his beloved Westphalia and became a *Freiherr* and owner of an estate.

He consulted Dr. Stirling about procuring a good man from England to buy his practice, and Dr. Stirling wrote to Sir George Humphry. In 1888 Dr. Marten arrived and was duly registered on March 7. He took on at once, and at first lived in the cottage on North Terrace, consulting at Grummet's rooms. In aspect he was somewhat under medium height, but broad, of rather youthful appearance, with a florid complexion and slight moustache. He was alert and bright in manner, with a quiet sense of humour. He secured at once a firm hold on Dr. Görger's practice, and before long the brougham or victoria and pair was again in commission, and Karl was outpacing the stately carriage of Dr. Verco or Dr. Davies Thomas, the hansom of Dr. Way or Dr. Gardiner. "Busy man that young Dr. Marten seems" was the universal verdict, and a busy man he became. Medicine was his only mistress; one never saw him in tennis flannels, nor spending hours watching test matches, nor attending races. He might be seen at Government House receptions—the occupants were generally his patients—but he would be restless there and imploring his wife to come away. His great idea was to go to bed early, and he had no hesitation in hinting to any intimate friends when it was time to retire.

Soon other patients began to hear of Dr. Marten and would express a wish to have him called in consultation. Some of the men—there were no women doctors at the time—used rather to resent this young man being preferred to, say, Dr. Verco or Dr. Way, but his conciliatory manner overcame their objections and they found that he could deliver the goods. It is a curious fact that without any hospital post of importance or any university lectureship, Dr. Marten should have so soon acquired such a widespread consulting practice with other doctors, his own private practice being essentially general. Certainly he was well equipped in every direction. He was a sound and expert surgeon, and as a physician most careful in examination; his diagnosis and prognosis were as reliable and his views as to treatment as helpful as is permitted to fallible mortals.

One remarkable feature about him was his memory for cases (as well as persons), so that he always seemed able to produce from the archives of his experience or reading something bearing upon the case in consultation.

I have said that he held no important hospital posts. It is true that in 1888 he was appointed an assistant surgeon for out-patients to the Adelaide Hospital, but in the great *débâcle* of 1896 he went out with the honorary staff and never sought reappointment. For a short time, too, he was on the staff of the Queen's home as an obstetrician, but this scarcely involved any work.

He was one of the earliest to appreciate the necessity for an X ray apparatus before specialists in that department arose.

Very soon he was able to acquire the house for so many decades known as Dr. Gosse's, next door but one to



the Adelaide Club, and here he resided for some five and twenty or thirty years. When he left North Terrace, driven away by the noise of the electric trams, he converted his house into suites of consulting rooms, and he also purchased for the same purpose the adjoining house of the late Dr. Phillips, so that he had a compact acre of land; the two houses he plausibly christened "Gonville Chambers" and "Caius Chambers". Both he disposed of a few years ago (and not exactly at a loss, it is understood) to the Shell Company, whose skyscraper has now obliterated the site of much of the medical history of old Adelaide.

I imagine that his practice was far more remunerative than that of any previous general practitioner in Adelaide, and his success may be attributed not merely to his ability and acceptability, but to the fact that he never refused to answer a professional call, however unpromising the prospects of the invitation. At the same time he had the cream of the practice of Adelaide, and the best testimony to the character of it is the fact that he had as assistants or temporary partners no less than three of the most prominent surgeons in Adelaide—Sir Henry Simpson Newland, Dr. Harry Gilbert, F.R.C.S., senior surgeon to the Children's Hospital, and Dr. Leonard Lindon, M.S., F.R.C.S., surgeon to the Adelaide Hospital. The last mentioned and youngest of the three, Dr. Lindon, imitated the custom of the good apprentice of Hogarth's day and became his son-in-law.

In 1890 Dr. Marten married Miss Annie Freebairn (May) Monteith, of North Adelaide. His eldest son (also Robert Humphrey), after distinguished service in Egypt and holding an official position in that country subsequent to the war, has now permanently settled down in England at Sheffield. His second son, Henry, destined for the medical profession, whilst at Cambridge joined the King's Rifle Regiment and was killed in the war.

This loss told upon Dr. Marten, who perpetuated his memory by a prize at Saint Peter's College. About 1924 he gave up practice; he became anxious about his health and nervous about his hypernesia; he spent his time chiefly in restless travels, having crossed the equator some twenty-seven times. He became an omnivorous general reader just as he had formerly kept himself abreast of medical literature. The death of his wife accentuated his restlessness, but some relief came in the companionship of his second wife, a relation and namesake of his former, Miss Mary Elizabeth Monteith, of England, whom he married less than three years ago. About eighteen months ago he returned to Adelaide. A year ago, nearly, he had an apoplexy and succumbed on April 8, 1933, in his seventy-third year.

Dr. Marten took no active part in any work outside his profession, nor can he be said to have been active in medical politics. His standing in the profession naturally insured his presidency for a year (1899-1900) of the South Australian Branch of the British Medical Association. He used to contribute a few papers and exhibit cases at the Branch meetings, but I cannot recall any outstanding contribution of his except his advocacy of Whitehead's operation for hemorrhoids, which he practised with success.

His thesis for the M.D., if I remember aright, was based upon the difference noticed in diseases met with in South Australia as compared with England. I know of no hobby of his, but he was loyal in contributing to the University of Cambridge Museum specimens of aboriginal culture, and I understand there is a "Marten" room there dedicated to his gifts.

One thing I am afraid I must confess: Humphrey Marten, in my opinion, never became an Australian; he was in it, but not of it.

Dr. H. Swift writes:

It is with very profound regret we have to record the death of Robert Humphrey Marten, M.D. (Cantab.), in his seventy-second year, at Crafers, South Australia. His death was not unexpected, as in May last year he had a severe cerebral hemorrhage, which left him with almost complete hemiplegia, and it was only by the continual skilful and tender attention that he received at the hands

of his wife and medical attendant that he lived as long as he did; but his heart gradually failed and he died on Saturday, April 8, 1933.

He took his M.R.C.S. and L.R.C.P. (London) from University College Hospital in 1883, and soon after was appointed a house surgeon at the hospital. In 1885 he was elected resident medical officer to Addenbrooke's Hospital, Cambridge, a position he held for three years. He was also entered as a student at Gonville and Caius College, Cambridge. He kept the Act for the M.B., B.C. degrees in January, 1888. It was whilst he was at Addenbrooke's that Professor Humphry (Professor of Anatomy, University of Cambridge) received a letter from Professor E. C. Stirling, of Adelaide, asking him to recommend a suitable man for a large general practice in Adelaide, and so Dr. Marten arrived in Adelaide in February, 1888, and joined Dr. Görger, who retired after a short time of introduction, and Dr. Marten succeeded to one of the largest practices in Adelaide. Dr. Görger retired from the staff of the Adelaide Hospital and Dr. Marten was appointed an assistant surgeon, a position he held until the retirement of the whole staff in the disastrous trouble with the Government in 1895. This practically ended his connexion with the hospital, for, after the cessation of the trouble, Marten did not rejoin the staff. To many of his professional brethren it has always been a matter for great regret that his undoubtedly surgical knowledge and skill were no longer available for the patients of the hospital, nor his services as a teacher for the students. But by that time he was a very busy man, for it is a remarkable fact that so young a man as he was then, and with his rosy cheeks and fresh, boyish complexion, looking younger than he was, was able to keep the practice together and really enlarge it. In 1888 he became a member of the South Australian Branch of the British Medical Association, and in 1899 he was elected to the presidential chair. His address at the end of his term of office, on the effects of migration from the northern to the southern hemisphere, was most interesting and revealed his great capacity for acute research and observation. In 1905 he went home to England to take his M.D. degree, keeping the Act with a thesis on disease in Australia and the Australian aborigines.

Upon his return he read a paper at a meeting of the Branch on surgical observations in Europe, and remarks: "The most interesting surgery I saw was undoubtedly at the National Hospital for Paralysis and Epilepsy in Queen's Square, where Sir Victor Horsley is to be seen in his element."

In 1902 Dr. Marten joined the general committee of the Queen's Home for Lying-In Women, which had recently been started, initiated by Lady Tennyson, the wife of the Governor of South Australia. He was elected Chairman of the Medical Board on March 25, 1902, and held this position continuously until February, 1912, thus showing how keenly interested he was in the home, and at the same time how much his services were appreciated by the Board of Management.

Although he was engaged in a general practice, he always had a marked preference for the surgical work. He was a very good operator, making full use of the unrivalled and unique opportunities he had in working under such masters as Professor H. Murray Humphry at Cambridge, and Heath, Victor Horsley, Godlee and Marcus Beck at University College Hospital.

From the former he acquired the necessary anatomical accuracy and had the wonderful experience of watching his marvellous touch and brilliant dexterity in operation for three years. Under Godlee (Sir Rickman now) and Marcus Beck he was initiated into Listerism at first hand with all its advances from the days of sprays and antiseptics to the present asepsis, and his technique was sufficient evidence of the advantage he had taken of his opportunities, for his cases did extraordinarily well under his careful manipulation. Under Sir Victor Horsley he acquired an early interest in brain surgery, and on his visit in 1905 he spent a good deal of time at the National Hospital, Queen's Square, and upon his return he concentrated upon the localization of cerebral diseases, with the result that he reported several cases of this kind upon whom he had operated with success.

He took no interest in and played no games. He cared nothing for sport or racing. His whole life was wrapt up in his work. He lived a most regular routine. It was noted as a fact that a watch could be regulated by the time (6 p.m.) that his victoria and pair would dash down King William Street, driven by old Karl. At any social function at night, soon after nine he would begin to fidget and look at his watch, and at 9.30 he would leave for his bed. He had a charming bedside manner and was beloved and trusted by all his patients. His cheery smile, fresh, rosy complexion and general air of well-being and joy in life rendered him a very popular member of society and of his brother practitioners.

He was twice married. By his first wife he had three children. The eldest, Roy, is living in Sheffield, England, the second, Henry, was killed in the war, and the daughter is married to Dr. Len Lindon, surgeon to the Adelaide Hospital. He retired from practice some eight years ago and went to live in England, spending a good deal of time in travelling and visiting friends and relations. In 1930 he married a cousin of his first wife.

SEPTIMUS GEORGE STRAHAN.

We regret to announce the death of Dr. Septimus George Strahan, which occurred on July 2, 1933, at Moonee Ponds, Victoria.

Post-Graduate Work.

POST-GRADUATE COURSE IN BRISBANE.

THE Queensland Post-Graduate Committee announces that the annual refresher course will be held in Brisbane from October 23 to 27, 1933. Further details will be published at a later date.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on July 3, 1933.

The Diploma in Tropical Medicine was awarded to the following: Frederick William Arthur Clements, M.B., B.S., Berwyn Lincoln Dean, M.B., B.S. (Melbourne), Edwin Archibald Holland, M.B., B.S. (Melbourne), Douglas Harry Kedgwin Lee, M.B., B.S., Dorothy Isabel Mills, M.B., Ch.M., George Jacob Maxwell Saxby, M.B., Ch.M., and Henry James Bandfield Stephens, M.B., B.S. (Melbourne).

It was resolved to accept with grateful thanks from the subscribers to the late Dr. Herbert Marks Memorial Fund the sum of £243 as a foundation of the Herbert Marks Research Fund.

Mrs. O. C. Beale presented to the Nicholson Museum and the Department of Latin a marble reproduction of the upper part of the Great Statue of Augustus (known as the *Prima Porta Augustus*), and three very large framed photographs of the Roman ruins at Timgad in North Africa.

It was resolved to accept these very valuable gifts with grateful thanks to the donor.

The following appointments were approved: Miss W. R. Mankin, M.Sc., as part-time Demonstrator in Physiology; Mr. R. L. Gabriel, B.D.S., as Honorary Demonstrator in Dentistry; Mr. R. H. Parker, M.Sc., as part-time Demonstrator in Chemistry; Dr. R. L. Spedding as Clinical Assistant to the Medical Out-Patients' Department at Saint Vincent's Hospital.

Correspondence.

THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS.

SIR: I have read the annual report of the College in your issue of today, and write as a surgical "vessel of pewter" with no unfulfilled ambitions about becoming a Fellow of the College.

It is stated: "The Council realizes that it is, unhappily, necessary to educate some members of the medical profession that the practice of surgery requires adequate and special training."

That being so, does the Council also realize that it is, unhappily, necessary to educate some of its own Fellows that the practice of medicine has similar requirements?

It is conceivable that when Fellows of the College attend serious medical cases, they may be medical "vessels of pewter", though bearing the hall-mark of surgical efficiency on their silver plating.

Yours, etc.,

VERNON DAVIES.

Wangaratta,

Victoria,

June 10, 1933.

THE PROBLEM OF GASTRIC CARCINOMA.

SIR: Dr. Darling's interesting paper of June 10 contains the following sentence under "Tests": "The test for occult blood is extremely simple, and may be carried out by anybody possessing an elementary knowledge of chemistry."

This is very encouraging, but will lead to many a fallacious finding unless the test is done after forty-eight hours of meat-free dieting, and, at least, twenty-four hours' diet free of green vegetables.

In regard to lactic acid, it seems only fair to remind your readers that, as abundantly reported in *The British Medical Journal* during the last twelve months, no reliance whatsoever can be placed on the lactic acid test as an indication for or against carcinoma.

Yours, etc.,

"PATHOLOGIST."

June 16, 1933.

THE TONSIL PROBLEM.

SIR: Though Dr. Bettington has not come up to the penitent's form, he is rising from his seat.

He quoted Layton of 1914. Why leave out Layton of 1933? "I never remove a tonsil in a child under eight years of age." Thirty years ago I was disturbed at the futility of treating sinusitis by tonsillectomy. Today I am convinced of the certainty of curing enlarged tonsils and adenoids by removing the sinusitis. Another astounding statement—well, I will finish with another more astounding statement. It is possible to cure a case of pansinusitis with gross polypoid degeneration in a man of forty-five, whose nose has been completely blocked up for five years, by therapeutic use of diathermy.

Yours, etc.,

W. KENT HUGHES.

22, Collins Street,
Melbourne.

June 17, 1933.

Proceedings of the Australian Medical Boards.

VICTORIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1928, of Victoria, as duly qualified medical practitioners:

Williams, Basil, M.B., B.S., 1929 (Univ. Melbourne),
Mount Magnet, Western Australia.

- Krantz, Roy, M.B., B.S., 1930 (Univ. Adelaide), Infectious Diseases Hospital, Fairfield, N.Z.
 Paul, Ivor John, M.B., B.S., 1932 (Univ. Melbourne), 98, River Street, South Yarra, S.E.1.

Additional diplomas registered:

- McLean, Ian Gideon, M.R.C.P. (London), 1932.
 Rosenthal, David Braham, M.R.C.P. (London), 1932.

Books Received.

EVOLUTION AND REDEMPTION, by H. P. Newsholme, M.A., M.D., F.R.C.P., B.Sc., D.P.H.; 1933. London: Williams and Norgate, Limited. Crown 8vo, pp. 267. Price: 8s. 6d. net.

CRAIG'S POSOLOGICAL TABLES, APPENDIX ON POISONS, INDEX OF DISEASES AND MEDICINES ARRANGED ACCORDING TO THEIR ACTIONS; Sixth Edition, Revised according to latest Edition of the British Pharmacopoeia by D. M. Macdonald, M.D., D.P.H., F.R.C.P.E.; 1933. Edinburgh: E. and S. Livingstone. Demy 18mo, pp. 124.

CLASSIFIED DOSES OF THE BRITISH PHARMACOPEIA 1932, compiled by B. L. Stanton, M.R.C.P., M.B., B.S., F.P.S.; 1933. Melbourne: W. Ramsay. Crown 8vo, pp. 45. Price: 3s. 6d. net.

Diary for the Month.

JULY 18.—New South Wales Branch, B.M.A.: Ethics Committee.

JULY 19.—Western Australian Branch, B.M.A.: Branch.

JULY 20.—Victorian Branch, B.M.A.: Clinical Meeting.

JULY 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.

JULY 26.—Victorian Branch, B.M.A.: Council.

JULY 27.—South Australian Branch, B.M.A.: Branch.

JULY 27.—New South Wales Branch, B.M.A.: Branch.

JULY 28.—Queensland Branch, B.M.A.: Council.

Medical Appointments.

Dr. A. L. Webb (B.M.A.) has been appointed Assistant Honorary Surgeon, Liverpool State Hospital and Home, Office of the Director-General of Public Health, New South Wales.

Dr. J. F. Walker (B.M.A.) has been appointed Government Medical Officer at Holbrook, New South Wales.

Dr. Robert W. Gibson has been appointed Medical Officer of Health at Murat Bay, South Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xiii, xv.

HOBART PUBLIC HOSPITAL, HOBART, TASMANIA: Junior Resident Medical Officer.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officers.

MOSSMAN HOSPITAL, MOSSMAN, NORTH QUEENSLAND: Assistant Medical Officer.

NEWCASTLE HOSPITAL, NEWCASTLE, NEW SOUTH WALES: Junior Resident Medical Officers.

ROYAL AUSTRALIAN AIR FORCE: Medical Officer.

SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Officers.

THE QUEEN'S (MATERNITY) HOME, INCORPORATED, ROSE PARK, ADELAIDE, SOUTH AUSTRALIA: Resident House Surgeon.

THE RACHEL FOSTER HOSPITAL FOR WOMEN AND CHILDREN, SYDNEY, NEW SOUTH WALES: Resident Medical Officer (female).

YALLOURN MEDICAL AND HOSPITAL SOCIETY, YALLOURN, VICTORIA: Assistant Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.I.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 125, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino, Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Combined Friendly Societies, Clarendon and Kangarilla districts. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65 Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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